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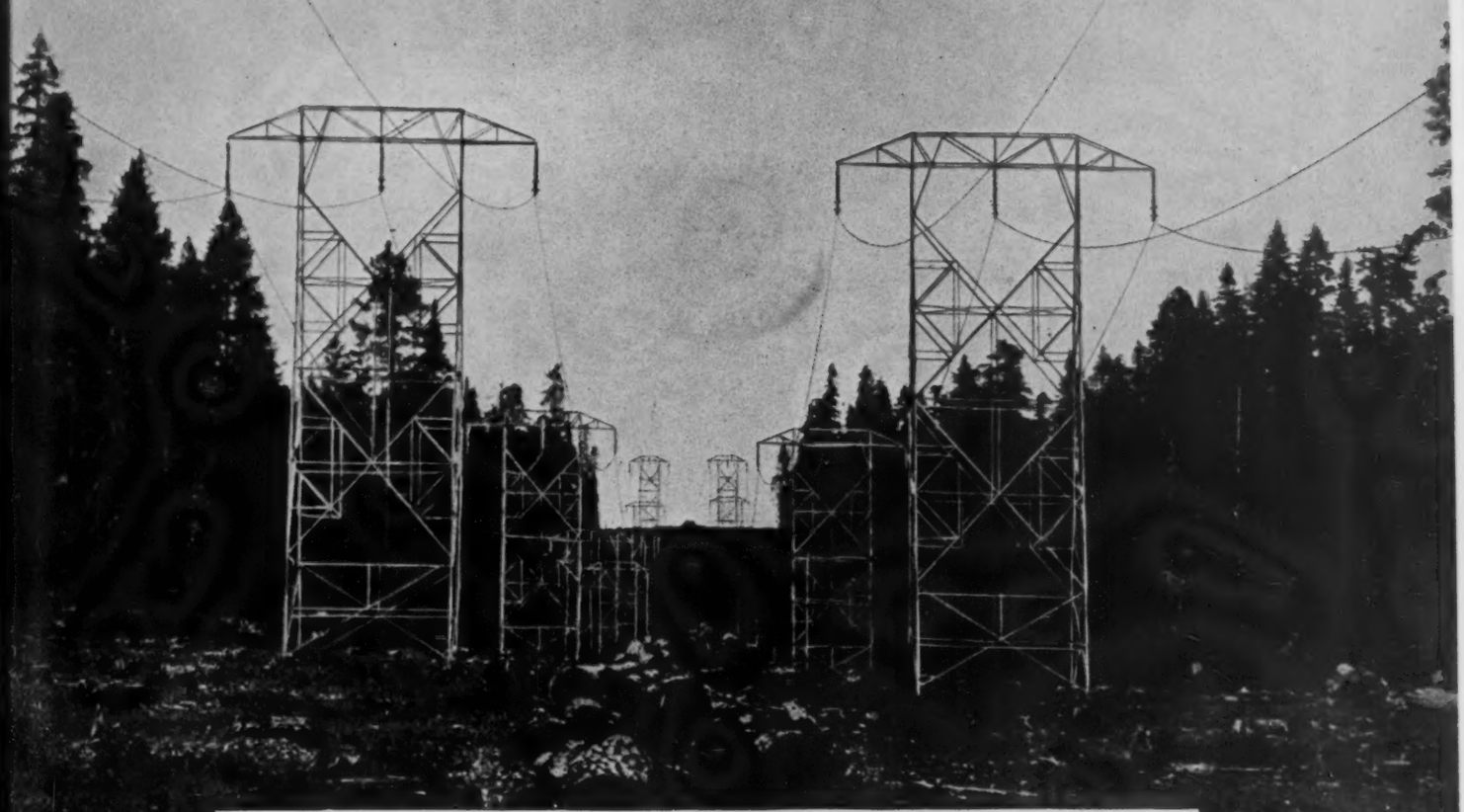
Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES



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Annual Merchandising Number

ON Oct. 15 next the Journal of Electricity will publish its annual merchandising issue. For some years past the feature of this issue has been the directory entitled, "Where to Find It in the West," giving a list of manufacturers of electrical and industrial equipment, machinery and supplies, together with the names and addresses of their Western distributing outlets. The care with which this directory has been compiled, the comprehensiveness of its indexing has made it an invaluable service to the industry. This feature will be presented as usual fully corrected to date of issue.

Our readers are already familiar with the extraordinary impetus being given to appliance and supply sales in the Western territory due to the addition of more than 250,000 kw. to the installed capacity of the central stations. The editors of the Journal now are conducting a research and analysis of the situation in all of the eleven Western states in order to present in its entirety the sales programs of all of the central stations in that territory. In volume, the total of new business thus being created is tremendous. Sales are being discussed in terms of many thousands of each type of current-consuming device.

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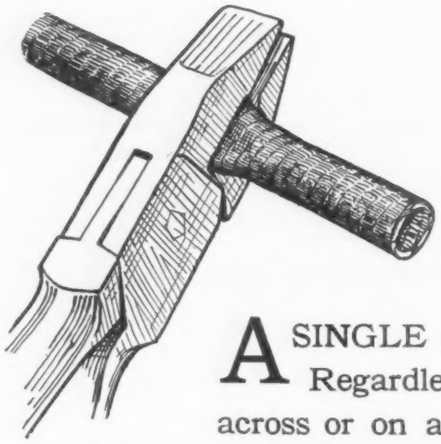

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EDITORIAL

A Good Job Well Done

IN this issue will be found the story of the development of Pit Three, the latest addition to the hydroelectric power development of the Pacific Gas and Electric Company. It marks another milestone along the road to electrical supremacy, the goal toward which the electrical industry in the West is striving.

As to the job itself, from its inception to its completion, too much cannot be said in praise of the great group of men responsible for the happy consummation that marked the dedicatory exercises on July 18 last. A work that called for the expenditure of some $13,500,000 within two years time is a large contract, even in these days of great undertakings and big figures. Nevertheless, it was completed within schedule time and within the original estimates of cost, the work having been handled almost entirely by the engineering and construction staff of the Pacific Gas and Electric Company.

This closely approximates the ideal of a self-contained organization, blessed with a staff of competent men thoroughly capable of designing, constructing and operating anything that those in authority may choose to undertake. Those who contribute to the success of the enterprise through their specialized articles of manufacture, be it apparatus or supplies, are participants in the credit that attaches to all concerned for a good job well done.

Which is the greater, the creator or the creation? There can be but one answer, and when those who have so successfully harnessed the waste forces of nature and converted them to the useful service of mankind pass on to their final reward, there will be left behind a monument to their greatness at which succeeding generations will never cease to marvel.

Cooperation and Organization Will Market California's Power Crop

ELECTRICAL history is being made quickly these days in California. The actuating force behind the present drive lies in the fact that some 250,000 kw. of additional installed capacity will come on the interconnected system of that state within this half of 1925. For this a market must be created, a task of no small magnitude that requires intelligent direction and co-ordination of all the forces at the command of the entire electrical industry.

Of the plans made by individual central stations due mention has been made in the news columns of the Journal of Electricity. These, however, cover but one branch of the industry. The other equally important branches, the manufacturers of aparatus, appliances and supplies, the jobbers who handle the distribution, and the contractors who undertake the responsibility of installation are preparing to join forces in order to take due advantage of this condition and extend the blessings of electrical service wherever the distribution systems of the central stations make such service possible.

Fortunately, the electrical industry in California is well organized—better organized than at any time in its history—and organization is the keynote of success. There is, of course, the Pacific Coast Electrical Association, primarily a central station organization, through whose studies and researches material of great value, both commercially and technically, is produced for the benefit and guidance of the entire industry. The Pacific Coast Jobbers Association always has been an efficient organization, alive to market conditions and trade extension. Then we have now in California for the first time a state-wide organization of contractors as a branch of the Electragists International with a membership of more than 400, the largest of any state in the country. The term "Electragist" is in itself a distinction that cannot be enjoyed by the unworthy or the incompetent for it is copyrighted, and certain standards of conduct must be observed by all those who hear this title.

In the California Electrical Bureau is the state-wide cooperative organization for sales promotion. Its advisory board is both representative and inclusive, embracing as it does every branch of the industry. Through the Bureau the sales promotion work is co-ordinated so that each branch of the industry may be benefited by taking due advantage of existing conditions.

A great opportunity is knocking at the door of the electrical industry in California; the industry knows it, and is organized, ready to meet it with extended hand.

Power Bureau Earnings and the Los Angeles City Hall

REPORTS current to the effect that the Los Angeles Bureau of Power and Light had donated $1,200,000 out of its "earnings" to be applied to the purchase of land for a new city hall for the southern California metropolis have created more than passing interest in electrical circles. That interest produced a pardonable curiosity on the part of investigators, who, not satisfied with the mere statement that so great a commercial achievement had been brought about, began to dismember the woodpile in the belief that sooner or later an Ethiopian would be forthcoming.

Behold the dusky aborigine! It seems that during the year following the voting of bonds for the purchase of Southern California Edison Company's distribution lines in the city the Bureau of Power and Light collected from the taxpayers the sum of $1,200,000 for the purpose of meeting interest and sinking fund charges on the $13,500,000 bond issue that had been voted.

The legality of the sale was contested, and the case remained before the courts for three years, during which time the system continued to be operated by the Edison Company for the city, and interest and sinking fund charges were paid out of earnings. All this time the $1,'200,000 was accumulating dust in the city treasury. It could not be used legally by the city except for the purpose for which the money was levied unless a special vote of the people authorized a change. This then is the story of the "earnings" of the Bureau of Power and Light donated to the city for the city hall project.

Rural Electric Service in Ontario

WITH rural electrification one of the most important questions before the industry today, the alleged extent to which the farmer has been supplied with service in Canada, particularly in Ontario, becomes a subject of interest. Were the American farmer forced to pay as dearly for this service as his Canadian brother, then there is little likelihood that he would be at all interested in lightening his farm work with the aid of electricity. A study of the rates paid in both Ontario and in California by the farmer for comparable service shows an enormous difference in favor of the rates of California's privately operated utilities. For limited service—lighting, a few appliances and a small motor—the Canadian farmer's bill would average $82.42 a year. For the same service the California farmer would pay $36 annually. For a larger degree of service the Canadian farmer would be charged $104.74 and the California farmer $48.60.

But this difference in rates is only part of the story. The following extract is from the annual report of the Ontario Hydro-Electric Power Commission for 1925, giving a part of an amendment to the Rural Hydro-Electric Distribution Act of 1921:

"Where power is supplied to a rural power district under the provisions of the Power Commission Act and amendments thereto, there may be paid to the municipality or commission distributing the power upon the recommendation of The Hydro-Electric Power Commission of Ontario and the order of the Lieutenant-Governor in Council, a sum not exceeding fifty per centum of the capital cost of constructing and erecting in the rural power district primary transmission lines and cables, service transformers and meters, and secondary lines on the highway required for the delivery of power in such rural district."

Moreover, these payments are made retroactive so as to take in all rural lines that have been constructed since the formation of the Commission.

Even with this government subsidy rural rates in Ontario are exorbitant, although power generated at Niagara has been classed as the cheapest in the world. Here is a story that the electrical industry can well afford to tell the farmers, whether they are now receiving electrical service or whether they are seeking it as is the case in many sections of the country.

Sell Refrigeration First, the Machine Afterward

AT the second session of the Commercial Section at the N.E.L.A. Convention in San Francisco domestic electric refrigeration held the center of the stage. Nearly the whole session was devoted to a presentation of an admirable report covering many phases of the subject, and to a discussion of this report by a number of enthusiastic commercial men present. Among the interesting material appearing in the record of proceedings of that meeting were two significant statements: the first, in the report, stating that there are now a little short of 67,000 machines in service; and the second, in the discussion, that there would be 10,000,000 sold in the next ten years. Balancing the prophecy of the one against the statement of fact of the other, one cannot help but marvel at the possibilities presented by this comparatively untouched field to benefit the entire electrical industry.

There is little doubt that domestic electric refrigeration is altogether feasible from an electrical, mechanical and economic standpoint, and that it promises to revolutionize the process of preservation of food in the home to the distinct advantage of the user. From the central station standpoint, considering load factor and diversity factor, it is not now possible to conceive of a better load with which to saturate the lines. With these thoughts in mind one easily visualizes the fulfillment of the prophecy expressed above.

The qualification of the prophet himself, however, is worth considering. He said, "The speed with which this market will be developed depends largely on how much support the refrigeration industry receives during the pioneering period," and this we would amplify to include "the kind of support." That period of time devoted to introducing a new device is of course a slow and tedious one compared with that later period during which the device, being well established in the public mind, practically sells itself. Let everyone realize that the big job during the pioneering period is to sell electric refrigeration to the public. While each manufacturer and each sales agency is scrambling for commercial supremacy, let him realize that he must sell electric refrigeration first and his particular machine afterward. Let there be nothing in his advertising or sales work that will tend to throw the shadow of doubt on the feasibility of electric refrigeration generally, since such action would react to the detriment of the whole industry.

Refuting the Charge that Utilities Are Making "Enormous Profits"

THE "enormous profits" credited to electric light and power companies by those who would see the ownership and operation of these utilities taken over by governmental bureaus would be considered niggardly in any other form of private business. Despite the assurance that these profits are regulated by law, the public has been wont to listen to the propaganda of politicians and others to the effect that the "power trust" is reaping a rich harvest at the expense of the people.

The utter truthlessness of such statments is brought out in a study of the operations of the twelve largest utilities in California made by the California State Railroad Commission at the request of the Department of Commerce. On another page of this issue is an item reporting the results of this study, together with other data compiled by the Journal of Electricity from the annual reports of the electric utilities in question. This shows that the approximate rate base of the companies which are doing 97 per cent of the electric business in the state in 1924 was $441,358,000. During that year the gross income from electric operations of these same companies was $80,115,257, the operating expenses $49,204,178, leaving a net return available for interest, sinking funds, dividends and surplus of $30,911,079. Thus the return on the approximate rate base for that year was 7.01 per cent. The report shows that on a similar basis, the return for 1923 was 8.61 per cent and for 1922, 8.89 per cent. Thus not only are the profits low, but they show a decided decrease for the three-year period.

In the face of such convincing figures as these it is difficult to understand how Governor Gifford Pinchot of Pennsylvania and others can make the statements which they do regarding the operations of the country's electric light and power companies. On the basis of the present rate of earnings there will be few fortunes made in the electric light and power business.

Another Political Body Seeks the Limelight

REPORTS have come from Washington that another august governmental body is ready and willing to consider the matter of the contract entered into between the City of San Francisco and the Pacific Gas and Electric Company for the disposal of power from the Moccasin plant of the Hetch Hetchy development. The legality of the agreement is purely a matter for the Interior Department to consider and pass upon. However, the Senate Public Lands Committee, which is to meet in San Francisco this fall, has announced its readiness to hear arguments on the contract, voicing as its right to do so the fact that it is interested in all uses to which the government's lands are put. In this instance it would appear that the committee seeks little more than an opportunity to bask in the limelight of political publicity which certain members of the fourth estate are giving to the Hetch Hetchy project at the present time.

DISCUSSION

Believes Article on Cost of Energy Merits Study by Engineers

To the Editor:

Sir—I wish through your journal publicly to congratulate Lester S. Ready, chief engineer of the Railroad Commission of the State of California, for his article "Factors Entering into the Cost of Electrical Energy" which appeared in your issue of July 15, 1925.

From a wide experience in the field of electrical applications I know that articles of the type written by Mr. Ready are invaluable in producing a direct understanding of the problems of the electrical industry on the part of those who cannot be reached through purely technical language. As a matter of fact, any engineer can read with a great deal of profit Mr. Ready's article, which illumines by illustration a rather difficult subject to present even in technical language, and does it in such a manner that the business as well as the technical elements of the problem are splendidly exemplified.

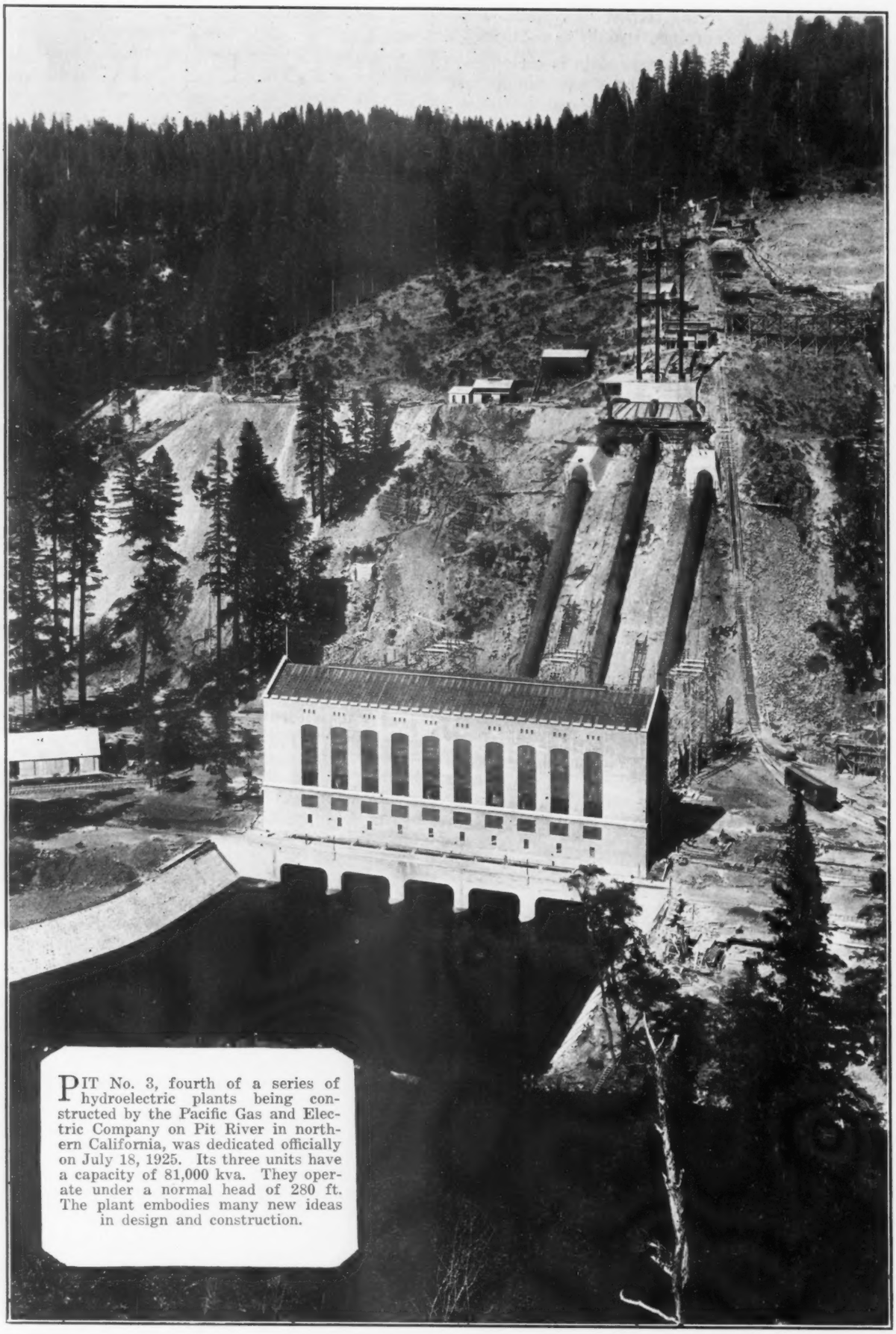
I would particularly wish to draw attention to Mr. Ready's statement, that from a strictly cost basis the lighting consumer should be charged a fixed sum per month, say 75 cents or $1 plus a lower rate for energy consumed, and have noted his belief that such a rate probably would result ultimately in lower rates to the consumers and would make available to those who desire relatively low rates for additional service for other conveniences in the home. This suggestion, in addition to being sound and constructive from a rate standpoint, has also a strong psychological appeal in that it would result in a rate more nearly understandable to the average consumer than the one to which he is at present largely accustomed.

In water rates for the City of San Francisco an average bill of $2 contains about 35 per cent as being a fixed charge for the maintenance of the consumer's meter and service, and the remainder of the cost being a charge for water actually consumed. The necessity for this is physically evident to any household consumer and it results to him in a lower rate per 1,000 cu.ft. of water, which more nearly satisfies his ideas of the justice of the situation.

From the power company's point of view it would seem also to have decided merit as it would without burdensome increase make the extremely small consumer pay a more just proportion of the total cost for service, and would enable the reduction of energy charges without reducing total income.

LOUIS F. LEUREY,
Electrical Engineer.

San Francisco, Calif.,
July 23, 1925.



PIT No. 3, fourth of a series of hydroelectric plants being constructed by the Pacific Gas and Electric Company on Pit River in northern California, was dedicated officially on July 18, 1925. Its three units have a capacity of 81,000 kva. They operate under a normal head of 280 ft. The plant embodies many new ideas in design and construction.

Pit River Hydraulic Development Involves Novel Features

By Walter Dreyer[1] and G. Ross Henninger[2]

THE geologic formation of the rock in the Pit River drainage basin is of such nature that storage is not required for the hydro plants of the Pacific Gas and Electric Company on that stream. However, this same formation presented difficulties in the selection of a dam site and the construction of the dam. In this article the authors discuss the various hydraulic features of the development.

NATURE kindly provides the necessary storage for the Pit River No. 3 development of the Pacific Gas and Electric Company in the form of vast areas of porous volcanic rock. Practically the entire geologic structure of this section of the country is of this type. Thus the waters from rains or from melting snows do not run off over the surface but drain vertically downward to the various water tables beneath the surface forming underground reservoirs. Springs fed from the underground reservoirs formed in the lava beds from the headwaters of this river. Similar springs add to the flow lower down the river course.

No appreciable storage is planned for any point on the system as all stations are designed primarily as stream-flow plants. What storage is provided by the various forebays will serve for purely emergency purposes and for carrying the peak loads. Such a plan of development is possible because of the peculiar character of the country which contributes to the Pit River an average flow characteristic of a normal variation of only about 15 per cent between average and minimum flow through the entire year. The basin of the Pit River is located in the four northeastern counties of California, Lassen, Modoc, Shasta and Siskiyou. The eastern (upper portion of this area is semi-arid and has little value as a source of power. The volcanic region in the western (lower) portion of the watershed, however, has a heavy precipitation.

A diversion dam on the Fall River and a 2-mile tunnel provide a static head of 454 ft. and an average flow of 1,218 sec. ft. for Pit No. 1 where this water enters the channel of the Pit River. The two Hat Creek plants No. 1 and No. 2 utilize the waters of a tributary to the Pit. For these plants static heads of 216.8 ft. and 201.3 ft. and average water flows of 332 sec.ft. and 503 sec.ft., respectively, were developed. Hat Creek flows into the Pit at a point just below the proposed site of Pit No. 2 where it is picked up by the Pit No. 3 reservoir.

One of the most interesting features from an engineeering standpoint is the diversion dam which forms a 9-mile lake of 32,500-acre-ft. capacity. It is a difficult matter to obtain suitable dam sites where the region is made up of an infinite number of lava flows which vary both in thickness and in composition. In general the prevailing rock formations are either basaltic or andesitic lavas, lava agglomerate, or tuff. These vary within themselves from solid rocks capable of withstanding almost any load to soft friable masses incapable of load. It is not uncommon to find that what appears to be a solid rock point is in reality almost entirely soft material with only a capping or veneer of hard basalt or andesite. This characteristic of the topography makes the use of the diamond drill absolutely essential in investigating a proper dam site.

Three miles of river were explored carefully by means of the diamond drill, shafts and horizontal drifts. Consideration was given to eight different possible sites before the final location was selected. This final site in cross-section is shown on Fig. 1 and consists of four formations which lay in a nearby horizontal position, having a slight dip downstream. The upper formation is locally termed the "upper rocks." These are approximately 200 ft. thick and form the abutments for the dam. These upper rocks are underlaid by a thick stratum of firm dense impervious tuff which is termed the "upper tuff." Tests of small, laterally unsupported cubes of the tuff showed it to have an ultimate strength equivalent to from 50 to 75 tons per sq. ft., while that of the rock is well above these values. The maximum foundation pressures under the dam are about 8 tons per sq.ft.

Below this formation is another thick stratum of rock termed the "lower rocks" which in turn is underlaid by a second tuff formation termed the "lower tuff." The thickness of this latter stratum is unknown. The river had cut its way through the upper rocks and was running on the upper tuff. Therefore it was necessary to construct the dam on two general types of foundation. The center section is founded on tuff and the abutments are founded on the upper rock. Settlement joints are provided at the junctures of the two types of foundation so that no ruptures will result from unequal

[1]Assistant Engineer, Division of Civil Engineering, Pacific Gas and Electric Company.

[2]Associate Editor, Journal of Electricity.

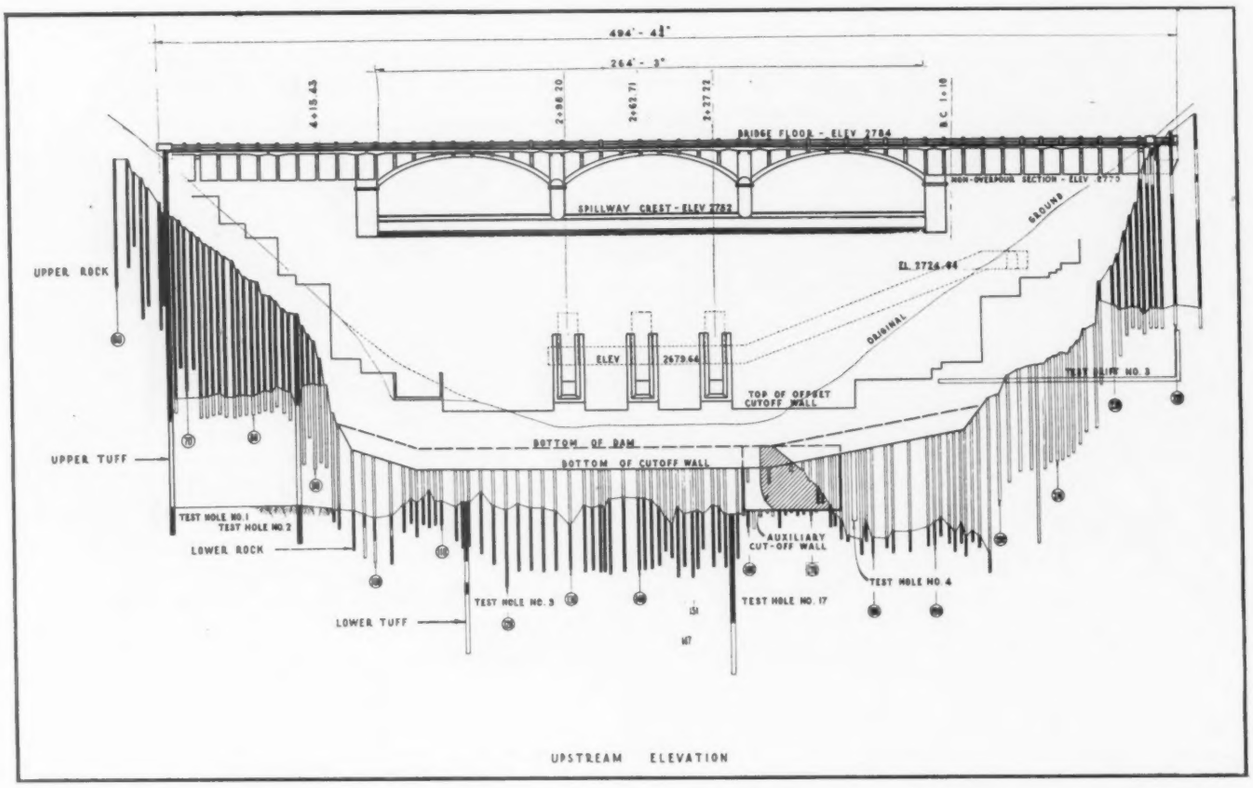


Fig. 1.—Cross-section of the dam site showing something of the geologic structure underlying the dam and showing grouting holes.

settlement. The dam (shown in Fig. 2) is of the ogee spillway type, arched in plan on a 500-ft. radius, and 112 ft. in height from foundation to the spill crest. The spillway portion is 267 ft. long and 18 ft. deep and is designed to pass a flood of 70,000 sec.ft. with the water level at the crest of the non-overflow section. The greatest recorded flood to date is 27,000 sec.ft.

A grouted cutoff wall consisting of a single row of holes spaced 3 ft. apart is provided under the usual cutoff wall at the heel of the dam. The cutoff wall was offset so that it projected 5 ft. upstream from the face of the dam in order to permit drilling and grouting operations to proceed simultaneously with the construction of the dam. Pipes were cast in this offset wall and the grouting holes were drilled through these pipes by means of a diamond drill. First, the primary holes of 24-ft. centers were drilled, tested for leakage and grouted. Next, the secondary holes halfway between the primary holes (12-ft. centers) were drilled, tested and grouted. This was followed by the first tertiary holes (6-ft. centers) and, where necessary, second tertiary holes (3-ft. centers). In this manner there was a progressive cementing up of the formation which could be checked by the results of the leakage tests. Leakage tests were made under a pressure equivalent to that imposed by the maximum water elevation of the reservoir and the grouting was done under a maximum pressure of 200 lb. per sq.in. Cement required for grouting averaged over one sack per lineal foot of hole.

A drainage system is provided for the foundation just downstream from the cutoff wall. A second line of drains in the form of "weep-holes" is provided through the apron at the toe of the dam and a third line just above the cutoff wall at the downstream end of the apron. Like the dam, the apron also was poured in sections so that any uplift pressures might quickly be relieved. The dam itself was designed with assumed uplift forces equivalent to full static head at the heel and reducing to zero at the toe with 50 per cent of the base area assumed as subject to uplift forces.

To permit lowering the water surface of the reservoir three sluice gates each with a 7 x 7-ft. clear opening were installed in the body of the dam. These gates are operated by high pressure oil from an operating chamber inside the dam. This gallery within the body of the dam also contains the necessary oil pumping and control equipment. Vents are provided to admit air just below the gate leaf.

A great deal of study was given to the problem of preventing erosion and scouring of the stream bed below the dam. The tuff formation resists erosion due to normal flow of the stream in an excellent manner, but it was deemed unsafe to discharge water over the ogee dam and onto the tuff without first destroying as much of the energy as possible. The use of a pool and the "hydraulic jump" seemed the most logical method, but could not be adopted at this site owing to the fact that to do so would require cutting through the impervious tuff to the more pervious "lower rocks." This was deemed inadvis-

able. Therefore baffle piers were constructed on the apron. Extensive tests were conducted on a model built to a 1/20 scale. Data from these tests greatly assisted in the final pier design and arrangement. It is interesting to know that the final arrangement differed materially from original ideas.

Spanning the spillway of the dam is a 3-span, open-spandrel, reinforced-concrete highway bridge. This structure replaces the older structure which was engulfed in the reservoir. Electric lighting standards and pleasing lines make this bridge an addition to the landscape as well as to travel facilities. Construction of a new portion of road to connect the bridge with the existing county highway also was necessary.

Tunnel Intake Structure

The reservoir is not used for storage and only the water contained in the top 8 ft. was considered necessary for regulating purposes. This figure was arrived at on the basis of permitting a shutdown of two days without wasting water. Thus weekly as well as daily regulation of the plant is provided for.

The tunnel intake is located 300 ft. upstream from the dam and is placed at the maximum elevation which will permit the required regulation. The structure (shown in Fig. 3) is quite large. Since the cost of the development is about $40,000 per ft. of head developed, every effort has been taken to see that no unnecessary head loss occurs. The trash rack has an area of 2,500 sq.ft. so that the maximum velocity through it is about 1.2 ft. per sec. The rack was designed to permit the installation of a rack rake at a later date should this feature be found necessary.

Below this rack the structure gradually reduces to the tunnel area where the maximum velocity is about 10½ ft. per sec. The shape and generous proportions of this structure should eliminate practically all entrance head losses. Two 8 x 18 ft., cast-iron, slide gates are installed at the entrance to the tunnel proper, these being provided purely for emergency use in the event that it is desired to drain the tunnel.

Tunnel

The tunnel is designed for a maximum flow of 3,000 sec.ft. It is of circular cross-section, 19 ft. in diameter, and is built on a grade of 3.1 per 1000. The tunnel grade was determined by the regulation elevation required at the intake and by the maximum surge elevation required at the lower end for acceleration. At Rock Creek the aqueduct emerges to daylight. This and the one adit driven for construction purposes provided six working headings.

The first section of the tunnel, from the headgates to the Rock Creek crossing, is 8,700 ft. long and the section from that point to the penstock manifold is 12,300 ft. Throughout the entire length of the tunnel with the exception of a very few hundred feet nothing more substantial than the aforementioned porous and partially decomposed volcanic rock was encountered. This meant that extensive timbering

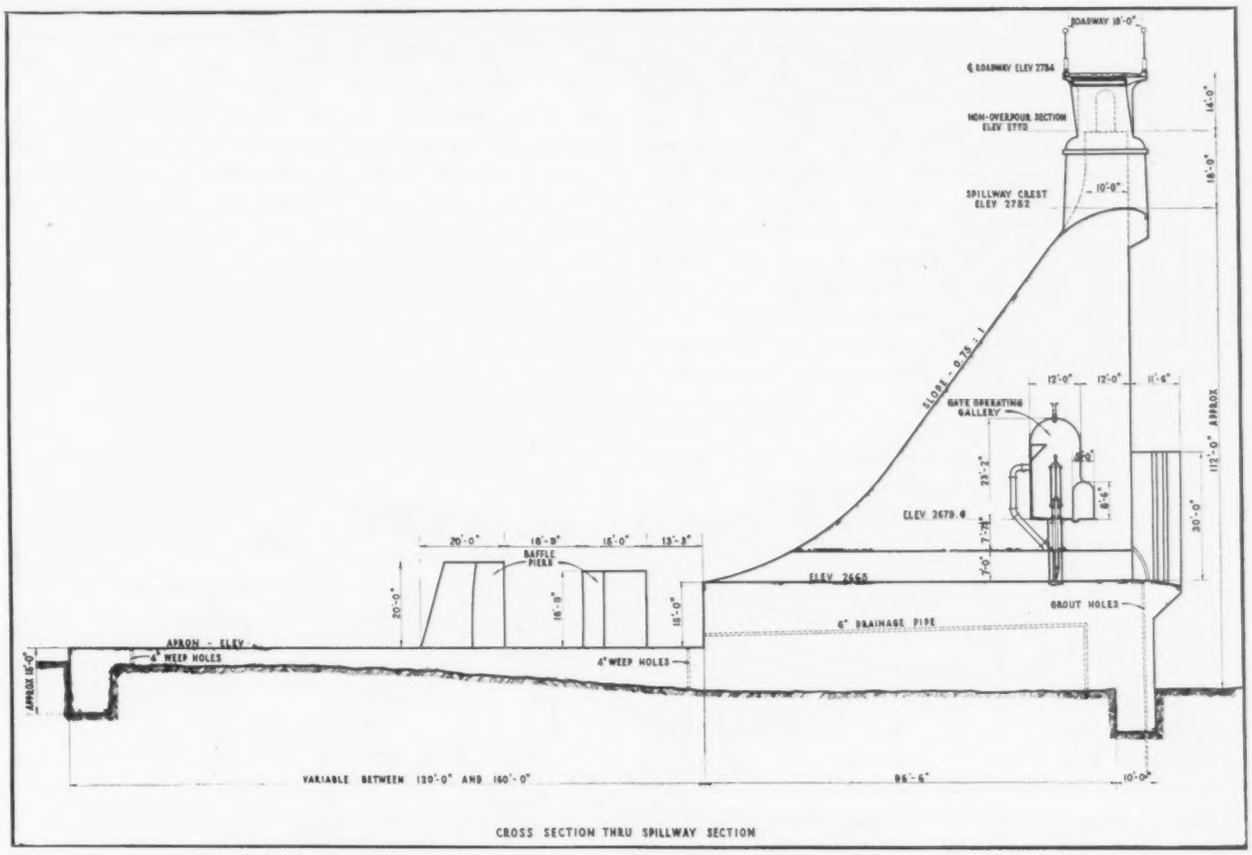


Fig. 2.—Cross-section of diversion dam showing arrangement of gate-operating gallery, apron, baffle piers and other features.

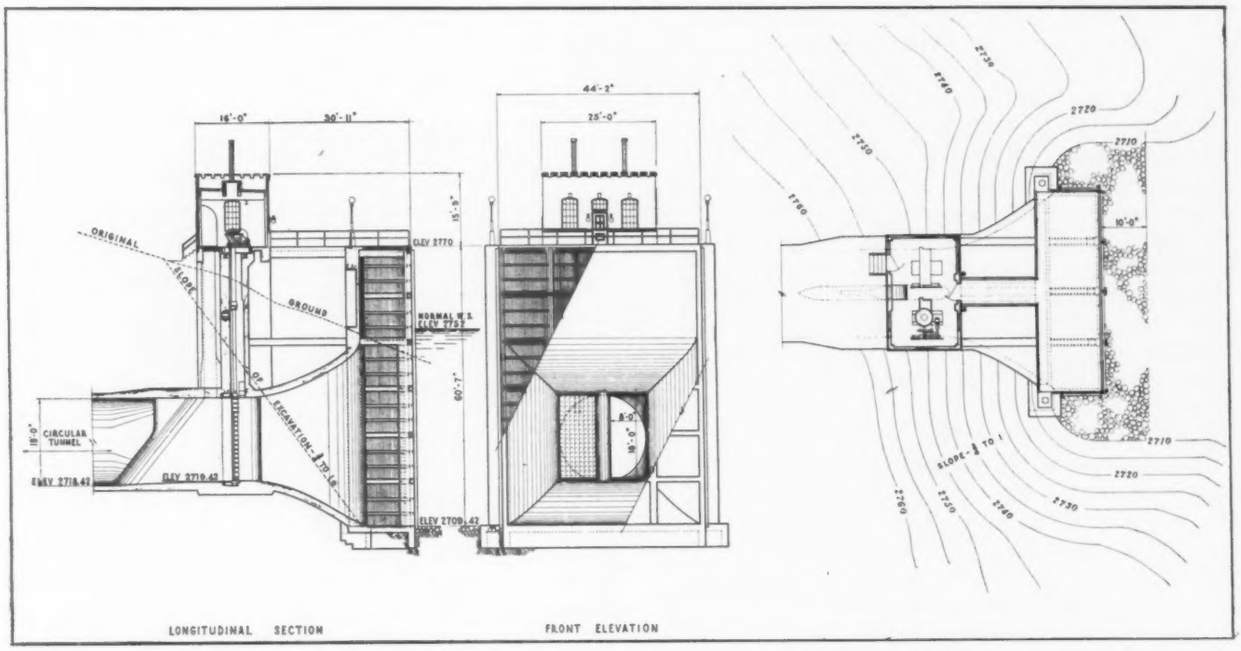


Fig. 3.—Longitudinal section (left), cut-away front elevation (center) and plan view of intake structure showing details.

was necessary during the construction period. Timbering used in the tunnel averaged about 100 bd. ft. per foot of tunnel and in some places ran as high as 160 bd. ft. per foot of tunnel. At one place one of the underground reservoirs abounding in that part of the country was tapped and drained into the tunnel for several weeks.

Since it was impractical to drive a circular tunnel of these dimensions in the lava mountain the usual horse-shoe shape was used for driving purposes only and later converted into a circular section. In the reinforced section of the tunnel the lower corners were backfilled carefully with dry rock before concreting operations began. In the untimbered sections of the tunnel it was more economical to pour these lower sections full of concrete than it would have been to have changed from circular to horse-shoe section for the short distances involved. It is interesting to note that 98½ per cent of the tunnel is reinforced for full hydrostatic head, no dependence being placed upon possible earth support.

Concrete lining of a minimum thickness of 12 in. in the few hundred feet of solid section and a minimum effective thickness of 16 in. in the timbered section accounted for the use of 75,000 cu. yd. of concrete and 5,000 tons of 1¼-in. reinforcing bars. The typical tunnel section is shown in Fig. 5.

This concrete lining was placed in four operations. First, a pair of curbs was poured, one each side of the tunnel railroad track. In these curbs notches were provided to receive the reinforcing bars. The reinforcing was placed between the first and the second operations. Second, a pair of arch footings, one on each side of the curbs, was cast. In these footings the necessary bolts were placed for the anchoring of the rails upon which the concreting machine carriage or "jumbo" traveled and for anchoring the lower ends of the steel forms. The third step in the pouring was the entire upper section above the footings. This was done with the combined use of circular steel forms and a concrete gun which forced the mix back into all of the crevices and which traleved as it filled the space. Cleaning and oiling of the steel forms before each re-set and the use of an air hammer to jar the lower portion of the form combined to produce an excellent smooth surface. A specially prepared form of diatomaceous earth known as Celite was used in the proportion of 2 per cent by weight of Portland cement to prevent segregation of aggregate during the long haul from the central mixing plant to the concrete guns and to increase the workability of the concrete. After this portion was completed the tunnel railroad track was raised to rest on timbers carried on the footings, and the tunnel invert or space formerly occupied by them was filled in to complete the circular section. All of this work was carried on progressively so that no part of it interfered with any other part. Mixing plants were located at both main portals and at the Rock Creek crossing.

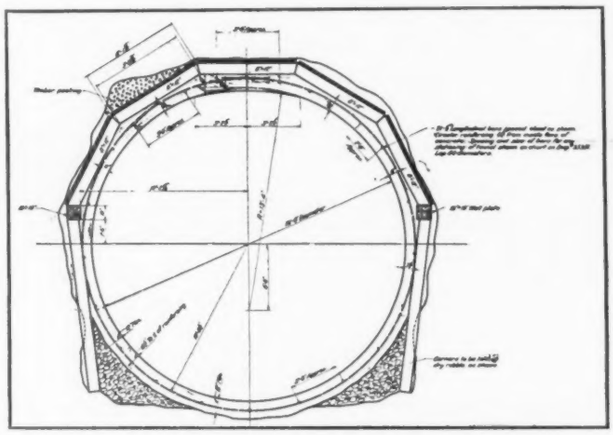


Fig. 4.—Typical tunnel section after placing of concrete.

At Rock Creek a reinforced concrete pipe, 254 ft. long and with 14-in. walls provides a conduit of a size and shape exactly the duplicate of the tunnel proper and directly in the line of the tunnel. This conduit is carried across the space intervening between the tunnel portals on a reinforced concrete bridge. Further to conserve all available water for power purposes a small concrete diversion dam has been constructed across Rock Creek a short way above the crossing. This dam, incidentally, served as the model for the tests for the design of the diversion dam. From this point the water is carried down through a 24-in. pipe line and discharged into the main conduit. The capacity of this addition is 25 sec.ft.

Surge Chamber

The surge chamber as shown in Fig. 4 is located about 200 ft. upstream from the lower tunnel portal and was offset in plan about 140 ft. from the center of the tunnel in order to avoid interference with the driving and lining of the tunnel.

Operating requirements for the design of the surge tank were as follows:

(1) A uniform increase in flow from zero to 3,000 sec.ft. in three minutes for acceleration.

(2) An instantateous rejection of 750 sec.ft. with a uniform retardation of the remaining 2,250 sec.ft. in two minutes for retardation.

(3) A maximum surge, on acceleration, of 60 ft. below the static level. This corresponds to 32 ft., or 10 per cent of the entire static head, below the normal level for full operation.

The surge chamber is of the simple type, 64 ft. in diameter at the bottom and having ¼ to 1 side slopes for a height of 60 ft. Above this is 94-ft. diameter cylindrical portion for the upper 27 ft. The best shape for hydraulic reasons would have been the frustum of a right cone rather than that of an inverted cone, but with the tank located entirely in excavation the form adopted greatly simplified construction as it was possible to pour the walls directly against the excavation without the use of lagging or back forms. The walls also were reinforced fully against hydrostatic pressure to avoid possible difficulties from cracking. A spillway is provided with the crest 3 ft. above the elevation of the overflow crest of the dam. This feature permits spilling the normal flow of the river over the diversion dam in the event of a long shutdown rather than spilling over the surge tank.

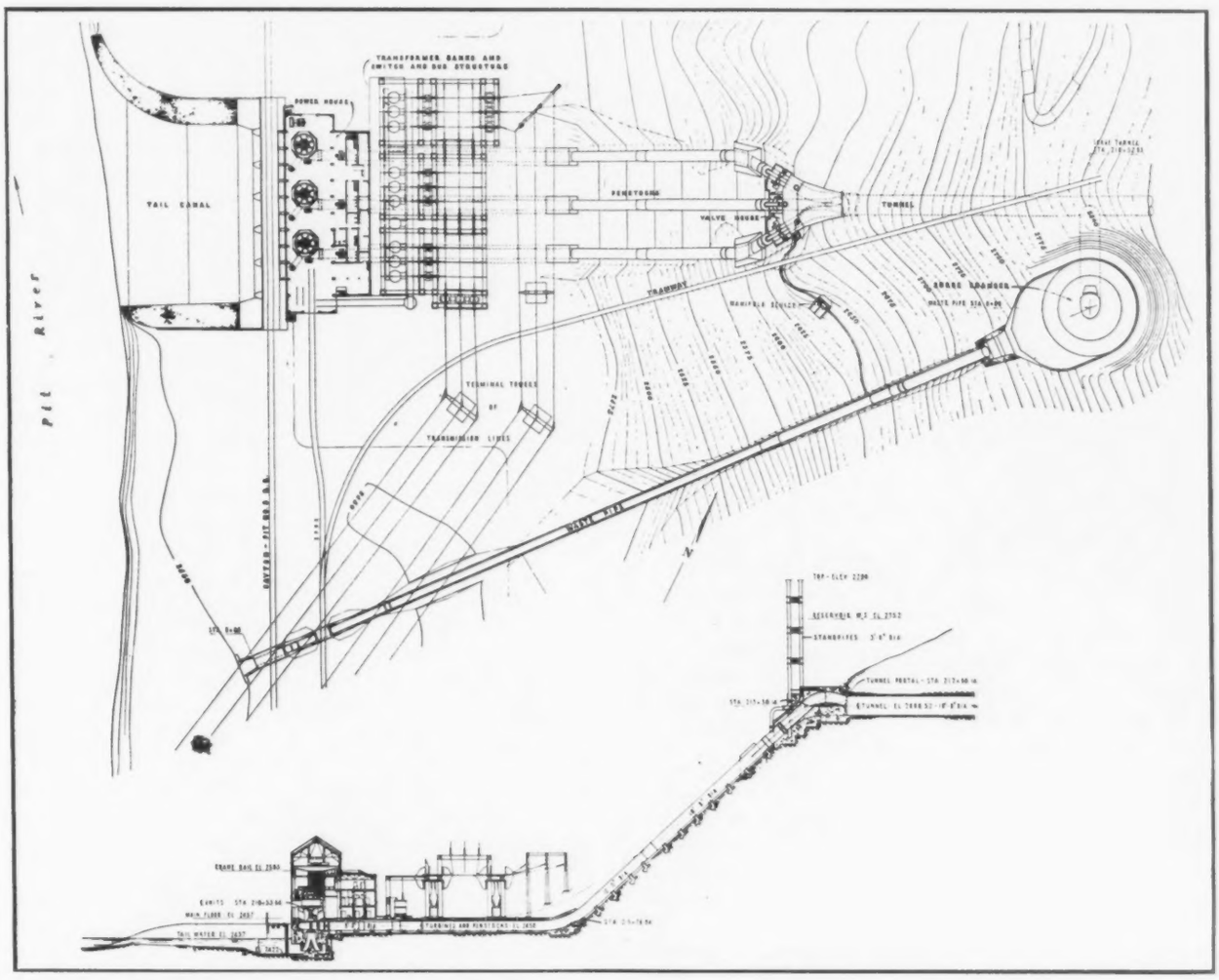


Fig. 5.—Plan and profile of power house, penstocks and surge chamber showing physical relations.

A spilling type tank was adopted for two reasons:

(1) Due to the fact that the tunnel is reinforced for practically its entire length any increase in head at the lower end would have increased greatly the cost of the tunnel and of itself would have been far more costly than the spillway and spill pipe. The design adopted effected a saving of about $30,000 in cost over that possible with any non-spilling type.

(2) The number and amplitude of pressure changes are reduced.

Water spilling over the crest is carried through a pipe line varying from 10 ft. at the upper end to 7 ft. 3 in. at the lower end, and discharged into the river about 300 ft. upstream from the power house.

It is of interest to interject at this point the fact that Lumnite cement was used to a good advantage in the finishing of the Rock Creek crossing, the bridge over the dam, the surge chamber and other smaller finish-up jobs. As is well known, this cement gains ordinary 28-day strength in 24 hrs. Furthermore, the quality of job turned out with this variety of cement is in every way satisfactory and at least on a parallel with those wherein ordinary Portland cement is used. In spite of the fact that this cement is more costly than common cement, its use was warranted because of the saving of three or four weeks' carrying charges on the whole project.

Manifold

Three 10 ft. 9-in. riveted-steel penstocks are brought together at the tunnel portal in a manifold of unique design. The manifold really consists of the tunnel itself, its circular shape gradually being distorted into three depressions each of equal area. These depressions gradually change shape until they break into three separate circular sections. It is at this point that the steel penstocks enter, each to its corresponding concrete section. All of the cutting edges are steel bound to prevent erosion by water flow. The arrangement of three pipes at the point of entrance is such that lines connecting their centers would form an equilateral triangle resting upon its base. The two outer pipes are at the bottom and at once make a combined vertical and horizontal bend which carries them to the ground level and laterally to a point in line with the centers of their respective units. The third pipe describes only a vertical curve which brings it to the ground midway between the other two. These bends were made as sharp as possible to reduce to a minimum the size of the concrete block. A 24-in. pipe enters the tunnel immediately ahead of the penstock pipes for the purpose of sluicing out any debris which may enter the tunnel. The forming for this manifold was rather complicated, but the results should prove to be well worth the efforts. This design was arrived at in the effort to effect minimum head loss.

Penstocks

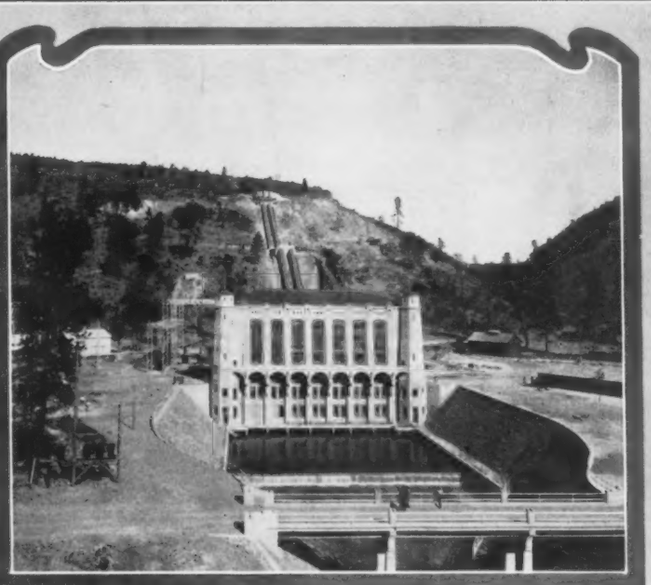
Butterfly valves 10 ft. 9 in. in diameter are installed immediately below the manifold, one in each penstock. These valves are housed in a concrete structure to protect the mechanisms from the weather. Each valve is arranged for remote operation from the power house switchboard in closing, but may be opened only by push-button control stations located at each valve. Mounted on the concrete manifold block are three 3-ft. standpipes, one of which is connected to each penstock pipe immediately below the butterfly valve. These three pipes are arranged in the form of a triangle and tied together by means of bracing trusses. This construction makes the whole unit self-supporting against wind loads.

The three 10 ft. 9 in. triple-riveted butt-strap, steel pipes extend 240 ft. down the hill from the manifold entrance to a point where the diameter is reduced to 10 ft. Following a 270-ft. length of this size pipe the diameter is dropped to 9 ft. through a 7-ft. taper section. Thickness varies from 7/16 in. at the top to ¾ in. at the turbine valve. At the final taper point water measurement is accomplished through an installation of Venturi meters which utilize the taper section to obtain pressure differences for the operation of the instruments. These taper sections are located in the tunnels where the penstocks enter the power house and hence afford a convenient location and means of securing pressure readings. Calibration of the Venturi meters was effected at the time that the acceptance tests on the turbines were run. These tests were made by the brine-velocity method. From the final taper section a 64-ft. length of penstock pipe extends to the turbines. This makes a total penstock length of 581 ft. including the length of pipe incorporated in the manifold.

Concrete piers support the penstocks slightly above the ground from the manifold down through the tunnels under the bus yard to the power house building. Johns-Manville service sheet packing is used to provide two graphited rubbing surfaces between the pipes and the piers. This reduces the coefficient of friction between the pipe and the piers permitting smaller piers and anchors. Expansion joints having copper-plated inserts are provided in each tangent section of each pipe. Heavy concrete anchors support each angle.

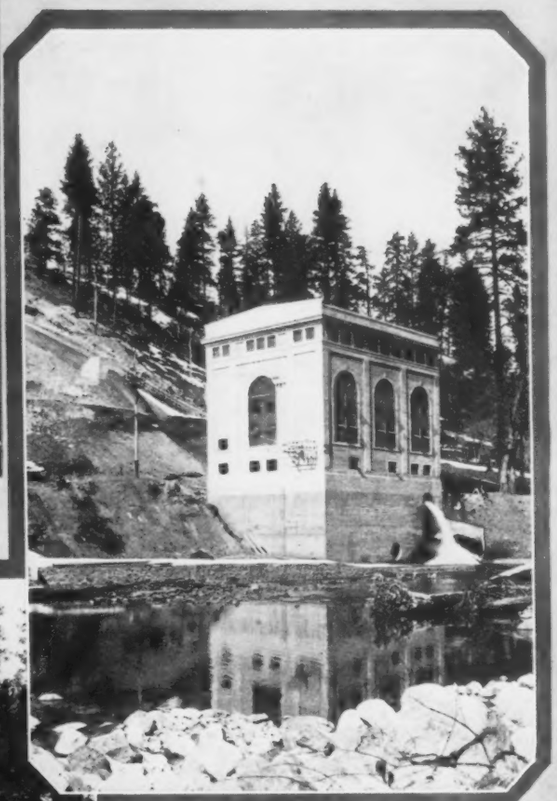
Methods of Rating Rivers to Be Standardized.— A joint technical committee now is being organized to bring about national uniformity in the methods of rating the water power of rivers, according to an announcement by the American Engineering Standards Committee. At the present time a given water power development may be rated at 10,000, 20,000 or 40,000 hp. by different engineers, according to the point of view from which the work is done by the engineers. For example, the first figure might mean that the power is practictlly available all the time without provision of any storage basin. The second might mean that this power is available a certain percentage of the time. The last figure might indicate that under certain conditions, as for example if a storage reservoir is provided, the most effective use of the river flow will be achieved when this rate is reached. At the instance of the Geological Survey, the A.E.S.C. made an investigation of the situation and found that many different groups were interested in bringing about national uniformity in the rating of rivers, including light and power companies, financial groups interested in power development, consulting engineers and others.

Pit River Hydroelectric Development

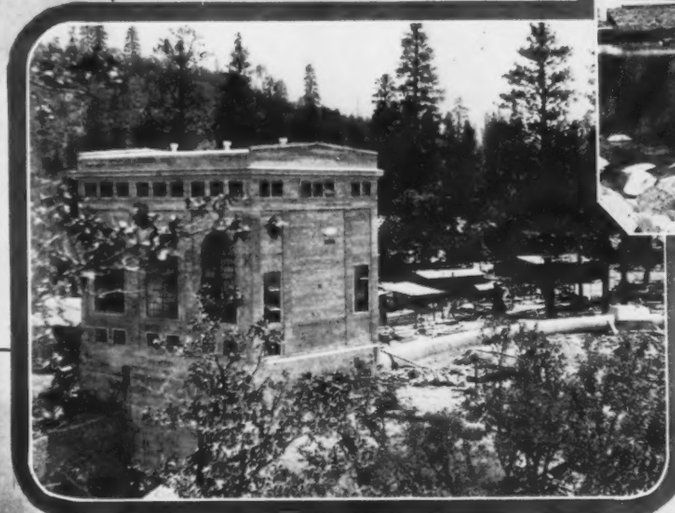


PIT Nº 1

PIT Nº 3



HAT CREEK Nº 2



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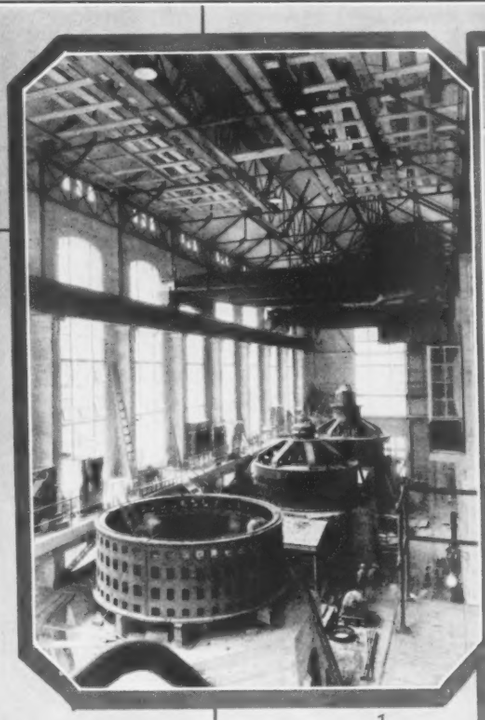

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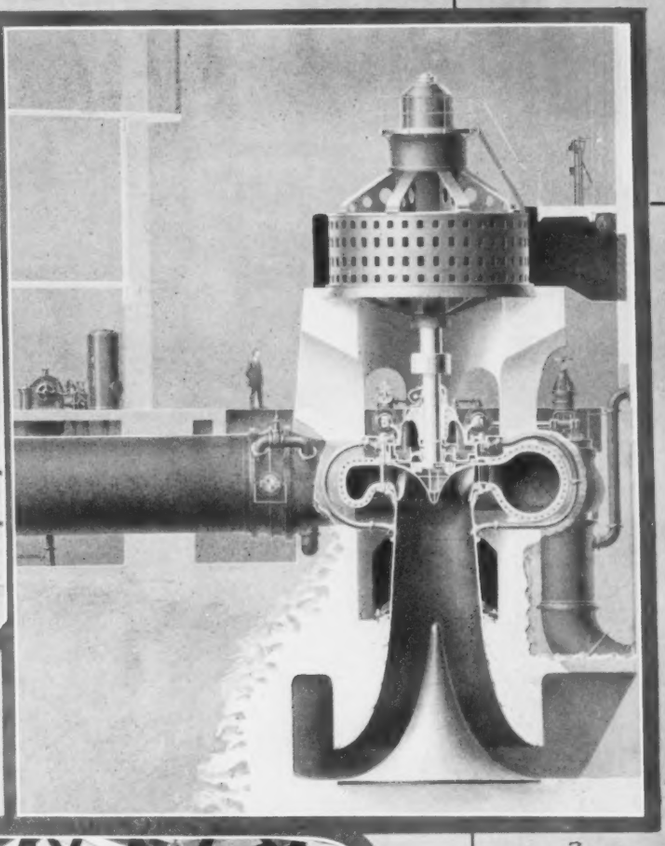

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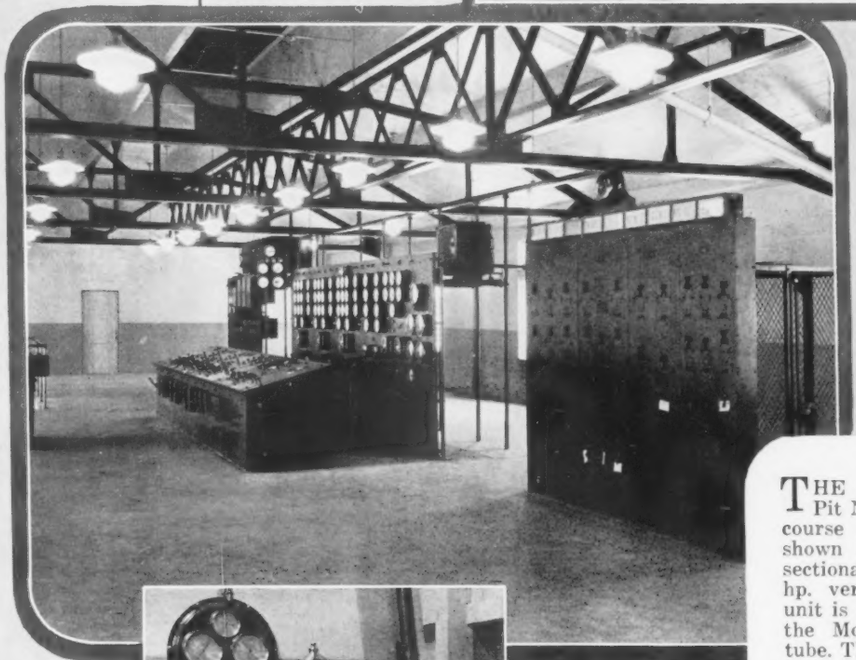

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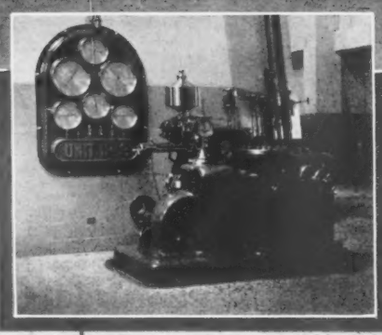

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THE three generators in Pit No. 3 plant during the course of construction are shown in No. 1. A cross-sectional view of the 33,000-hp. vertical reaction Pelton unit is shown in No. 2. Note the Moody spreading draft tube. The hydraulic units embody many new ideas. No. 3 shows the control room and benchboard. The operator stationed here has an outlook over the entire turbine floor as well as the outdoor switchyard. The gear-driven Pelton governor is shown in No. 4.

A section of the 4-mile tunnel, which is concrete-lined throughout its entire length, is shown in No. 1. The finished tunnel has a 19-ft. circular section. It was driven from six headings. No. 2 shows a section of the tunnel with reinforcing steel in place during the course of lining operations. No. 3 shows a view of the downstream face of the dam, which is 112 ft. in height from the foundation to the spillway crest. No. 4 shows an upstream view of the dam with a portion of the 9-mile lake, which has a capacity of 32,500 acre-ft.

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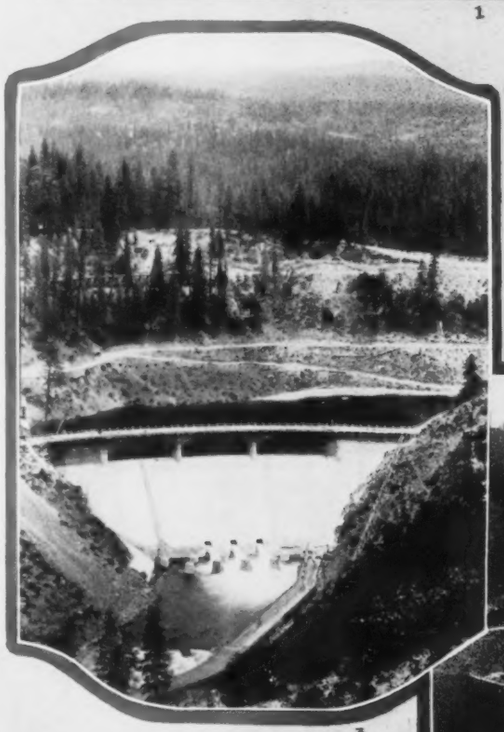

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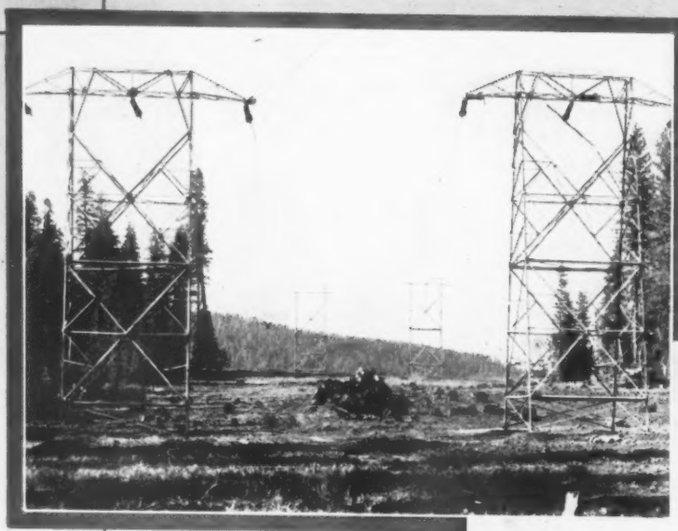
ENERGY from the Pit No. 3 plant is transformed to 220,000 volts and poured into the company's network. A view of the 220-kv. transmission line near the station is shown in No. 1. No. 2 shows the Vaca-Dixon substation terminus of the 202-mile 220-kv. Pit River line. The 220-kv. switchyard at the power house is shown in No. 3. The 220-kv. disconnect switches can be seen at the top of the bus structure. No. 4 shows the power house, bus structure, transformers and oil switches from the penstock line.



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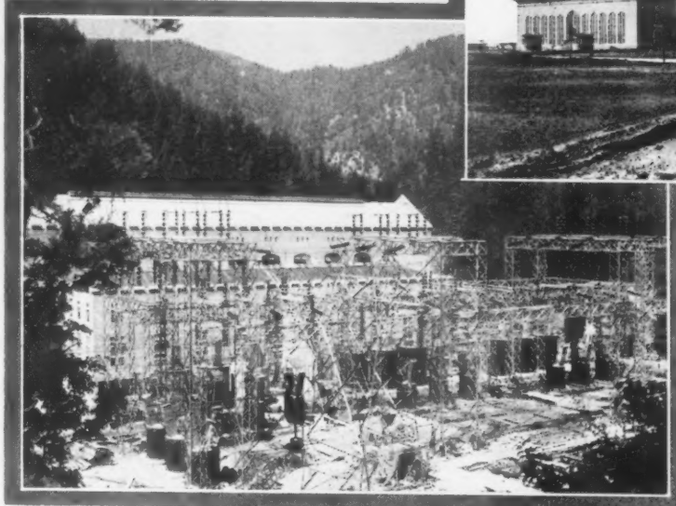

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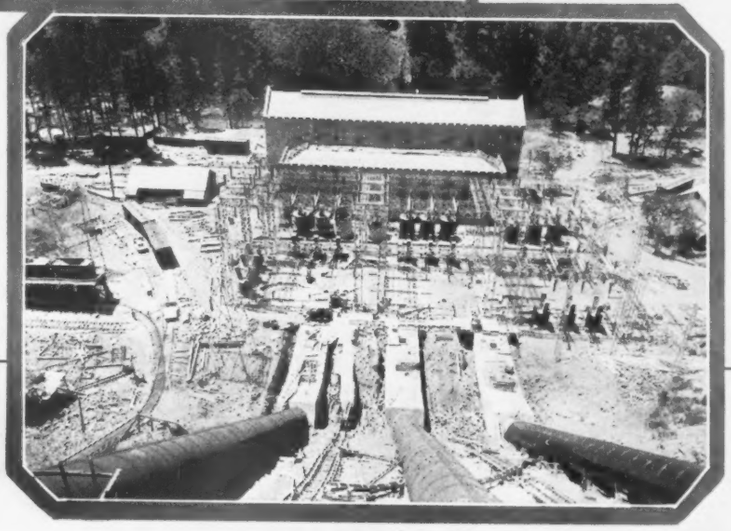


4

Second Largest Plant on Coast Completed by Pacific Gas and Electric Company

By G. Ross Henninger

Associate Editor, Journal of Electricity

PIT No. 3, fourth of a series of hydro-electric power houses being constructed by the Pacific Gas and Electric Company on Pit River was dedicated officially on July 18, 1925. This plant embodies many new ideas in design and operation. In this article the author discusses the electrical features of the generating station.

ADDING another important chapter to the history of electrical development in the West, the 81,000-kva. Pit River Power House No. 3 of the Pacific Gas and Electric Company was dedicated officially to "Pacific Service" July 18. This plant is the second of a string of seven or eight plants contemplated by that company to utilize the 2,100 ft. of head available in the 60 miles from a point on Fall River above Fall River Mills to a point on the Pit River below Big Bend. Of this total four plants now are complete: Pit No. 1 with a capacity of 70,000 kva., Hat Creek No. 1 and No. 2 each with a capacity of 12,500 kva., and Pit No. 3. According to present plans, the remaining plants will have been completed by about 1935. A map and profile of the entire project showing the physical relationships between the various plants is shown in Fig. 1. It will be seen that with this arrangement of the series of plants the afterbay of one plant becomes the forebay of the next. This necessitates careful consideration toward effecting the most economical use possible of the available water. Each plant is affected vitally by the amount of water passed by the plants above. Of course, it will be necessary from time to time to have units out of service for purposes of repair or inspection. At these times it is essential that water requirements for the lower plants be taken care of. Thus it was as necessary to give as careful thought to the question of the proper number of units to install as it was to consider the economic factors of first cost and plant flexibility.

Building

A reinforced concrete, steel-frame building houses the generating equipment and the low-tension switching equipment. The ground under the building is river deposit which has become hardened with the passage of time. The generator room is 45 ft. wide, 192 ft. long and 62 ft. high to the roof trusses. Figs. 2 and 3 show, respectively, a section through and a plan of the station and bus structure. Two 75-ton Cyclops cranes are installed here for the handling of the generating equipment. While the first cost of the two cranes and the equalizer beam was about 20 per cent greater than would have been the first cost of a single 150-ton crane, the additional cost of the building to provide for the heavier concentrated loads incident to a single crane would have offset this slight saving. In fact, a saving of about $12,500 was effected through the use of two cranes instead of one. Furthermore, it is a distinct advantage to have two cranes available for the construction period. The loads usually handled during the normal operation of a power house are such that they may be handled easily by one 75-ton crane. When loads of more than the capacity of a single crane are to be handled, use is made of an equalizer beam by which the united lifting efforts of both cranes may be applied to a single load. Only when the entire rotor of a generating unit is to be raised is it necessary to use the combined cranes.

No "generator floor" was provided, all generators being set upon pedestals. Easy access to the tops of the generators is provided by means of a walkway which continues around one end of the building from the switchboard floor. A second walkway was built along the tailrace side of the building at the elevation of the tops of the generators. This latter walkway is connected to the first by a short flight of stairs and to the platform on top of each generator. Thus it is unnecessary for an operator to descend from the control room to the ground floor and then climb to the generator tops.

Adjoining the generator room is the switch house. This is a three-story building 160 ft. long and 36 ft. 6 in. wide housing of all the 11-kv. equipment and the control room. The control room is on the third floor and is built to provide an outlook over the entire turbine floor as well as over the outdoor switch and transformer yard to the rear of the power house. All controls are located on a bench board. Hand-reset relays are located on the front of this board on the vertical panels. Directly in the rear of this board is located the main meter and relay board. Meters are mounted on the upper sections and relays on the lower portions. Two auxiliary switchboards are provided, one on either side of the main meter and relay board. Control switches for all of the station auxiliaries are carried on one of these. This is a Drendell steel-panel board and arranged to be entirely "dead front." All current-carrying parts

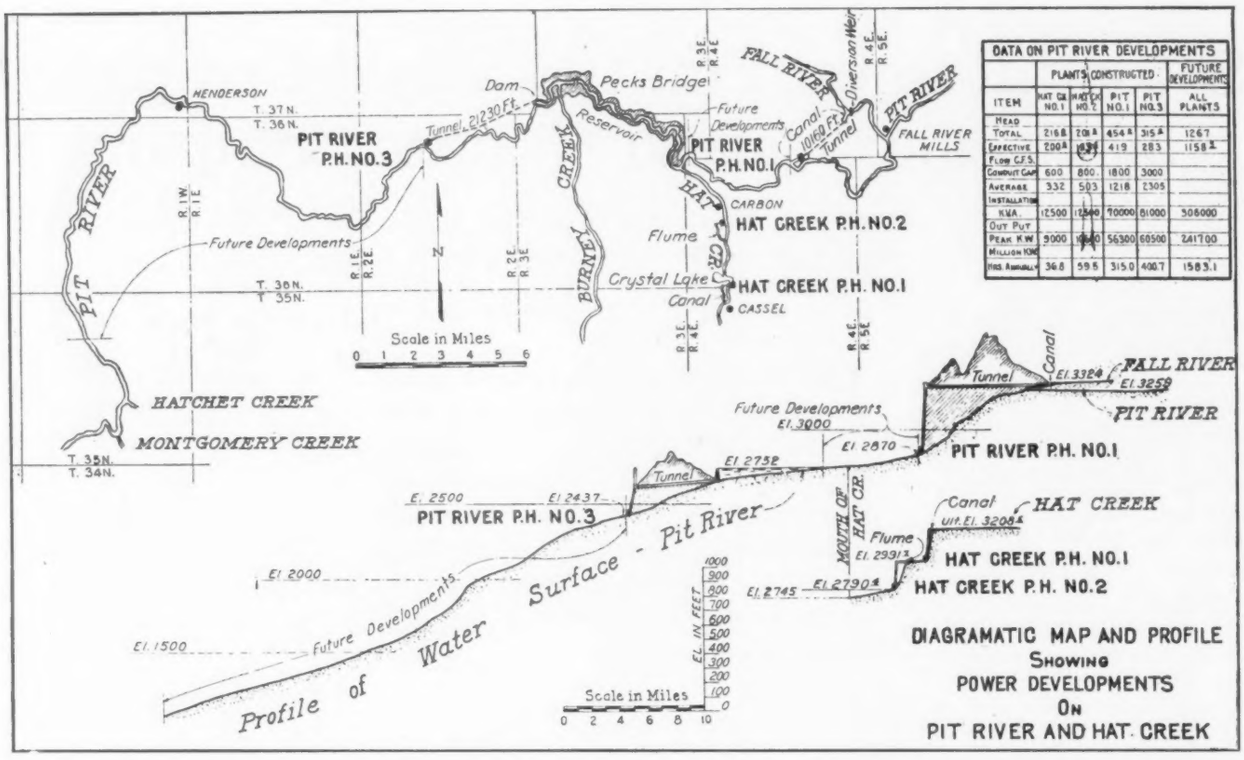


Fig. 1.—Schematic map of the Pit River covering the 60 miles in which the Pacific Gas and Electric Company is developing hydroelectric power.

are thoroughly shielded. Fuses may be replaced in the circuits through doors provided in the steel panels which can be opened only when the circuit so protected is dead. Automatic voltage regulators for the main generators, controls for the 7½-kw. battery chargers and for the station storage batteries are carried on the other auxiliary board. The 125-volt, 500-amp.-hr. Exide storage battery is located in a room adjoining the operating room. Duplicate motor-generator charging sets are provided.

Pacific Materials Company "Duraflex" asphaltic composition floor covering is used on the floor of the operating room. This material has a high dielectric strength and will resist puncture up to 12,000 volts per ⅛-in. thickness. In addition to this desirable characteristic the material provides a solid but at the same time resilient walking surface.

The second floor of the switch house is occupied by the main 11-kv. bus structure and the 11-kv. oil circuit breakers. The floor throughout the 11-kv. bus rooms is of 1 in. thick Trinidad Lake asphalt mastic laid by J. S. Porter Company. This one-inch flooring has a puncture value of about 110,000 volts. This structure is described in detail later in this article. Corresponding space on the ground floor is taken up by station power transformers, 11-kv, service bus, and bays through which pass the leads from the machines and transformers.

Turbines

The 33,000-hp. Pelton hydraulic turbines at Pit 3 are among the largest in the West. They are designed to operate under a normal head of 280 ft., each taking 1,000 sec.ft. of water at that head. Many recent improvements in design and some departures from standard practice for this part of the country are noted in this installation. Each of the turbines is of the vertical type. The cast steel casing is made up in sections the largest of which weighs 20 tons. Water enters the turbine through a 9-ft. butterfly valve which is provided to facilitate complete shutdown of the unit. This valve may be used also for control of the unit within synchronizing speed at no load in case of excessive guide-vane leakage. Control of this valve is by means of an electric motor arranged for push-button operation from a station within full view of the valve. Remote control for closing only is provided from the switchboard. Emergency hand operation is provided for. Governor servomotors for operation of the guide vanes and the relief valve are mounted directly on the turbine casing. Water which may be rejected by the turbine through quick closing of the guide vanes is bypassed momentarily through the relief valve because of the rigid mechanical connection between the guide-vane mechanism and the relief valve operating mechanism. The connecting mechanism between relief valve and servomotors is strong enough to block guide-vane movement in the event of an incident or accident of any kind hindering normal operation. Thus the relief valve serves not only to prevent damaging pressure rise in the penstock, but serves also to provide safety to the unit should a rupture occur in the pressure oil piping. The relief valve can pass 80 per cent of normal turbine water with full gate opening. These bypasses normally

are operated on the water-saving basis, but may be changed for synchronous bypass operation if desired.

Helical gears arranged on the main turbine shaft drive the governor mechanism. This eliminates the usual and bothersome belt connection between unit and governor. To steady the operation of this equipment a gear oil-pump is operated by the governor drive shaft. This pump and a duplicate motor-driven pump for starting periods furnish oil to the main turbine bearings. Each of the disk-type guide vanes is provided with thrust bearings and is grease-lubricated by means of individual hand-operated pressure lubricators. Governors are arranged for complete remote control from the switchboard. Remote control is provided also for the load-limiting device, and the position of this device is indicated at the switchboard by means of instruments devised for this purpose and located on the meter panel. Instruments showing the per cent of gate opening also are provided. A solenoid operated from relays or from an emergency push-button on the main switchboard provides for emergency shut-down.

Individual oil pressure sets for the governors are installed for each machine. Each set includes duplicate pumps, one motor-operated and the other operated by a small Pelton wheel. These sets are located on the main floor, each near its respective unit. One sump tank, a self-priming strainer for each pump, one pressure tank, one unloader and the necessary valve arrangements to permit either pump to deliver oil from the sump to the pressure tank complete this equipment.

License to use the Moody spreading draft tube was supplied by the Pelton Water Wheel Company as part of its contract. This type consists of a spreading cone inside of the draft tube. This may be seen in Fig. 2. The upper section of the draft tube is designed to be easily removable to facilitate the removal of the turbine runner without disturbing the generator. Reinforced concrete comprises the balance of the draft tube, including the central cone. Construction of draft tubes for the size units installed at Pit 3 is expensive at best. The concrete bulk is large and the form work complicated. If the guarantees of the turbine makers are to be realized the draft tubes must be constructed accurately to specifications and must present smooth flow surfaces. Thus the form work is expensive and much hand work involved in providing the necessary smooth concrete face.

At Pit 3 construction costs were reduced and a better job secured through the use of steel liners for the draft tubes. These liners were made up of $\frac{3}{8}$-in. steel plates, butt-strap riveted on the side away from the water surface with counter-sunk rivets. These liners acted as forms and as such required only rough shoring to hold them in place and prevent deformation during the pouring operation. Furthermore additional resistance to erosion is offered by the steel liners.

Generators and Equipment

Three main generators supplied by the General Electric Company comprise this division of the equipment. Each unit is rated 27,000 kva. at 0.9 lagging power factor, 3 phase, 60 cycle, 11 kv., and operates at 225 r.p.m. One 160-kw., 250-volt exciter is mounted on the upper end of each generator shaft. Each exciter is designed to supply only its corresponding generator. Cooling air for the generators enters from the operating room, passing into the windings through the open center of the pedestal which supports the generator. The heated air is discharged into a sheet metal housing which conveys it to the exterior of the building on the tailrace side. Exit is through metal louvres in the walls of the building. When it is desirable, heated air may be exhausted into the operating room through doors provided for the purpose in the generator air-housing. For regulating the amount of discharge opening and consequently the proportion of air discharged to the atmosphere, doors are provided inside of each louvre. These doors are operated from outside the air housing. These as well as those for passing air from the housing into the operating room all are automatic and arranged to close automatically from any position upon the operation of the generator differential relays. This serves to stop all ventilation and would assist in quelling a fire

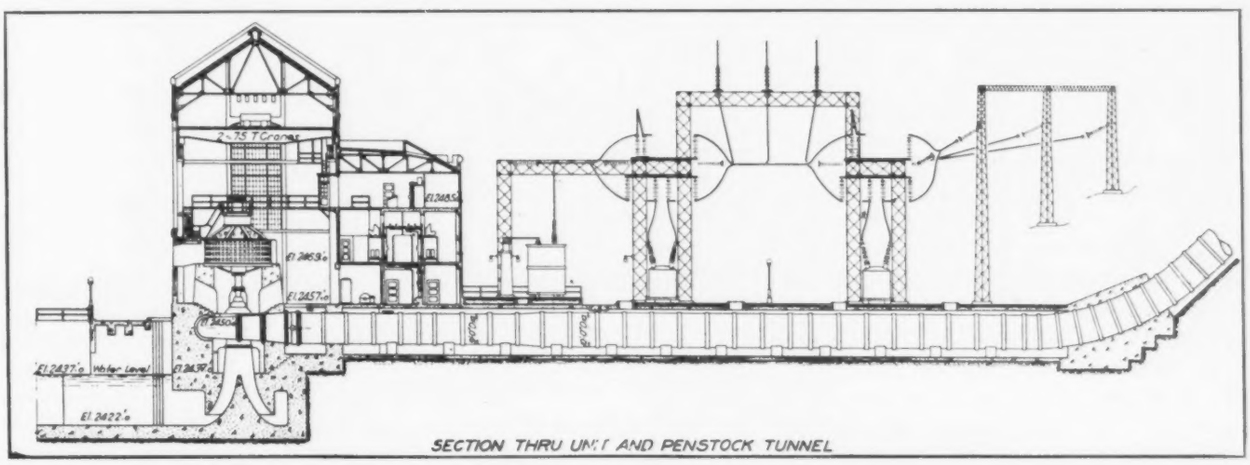


Fig. 2.—Section through a generating unit, penstock tunnel, power house and bus structure.

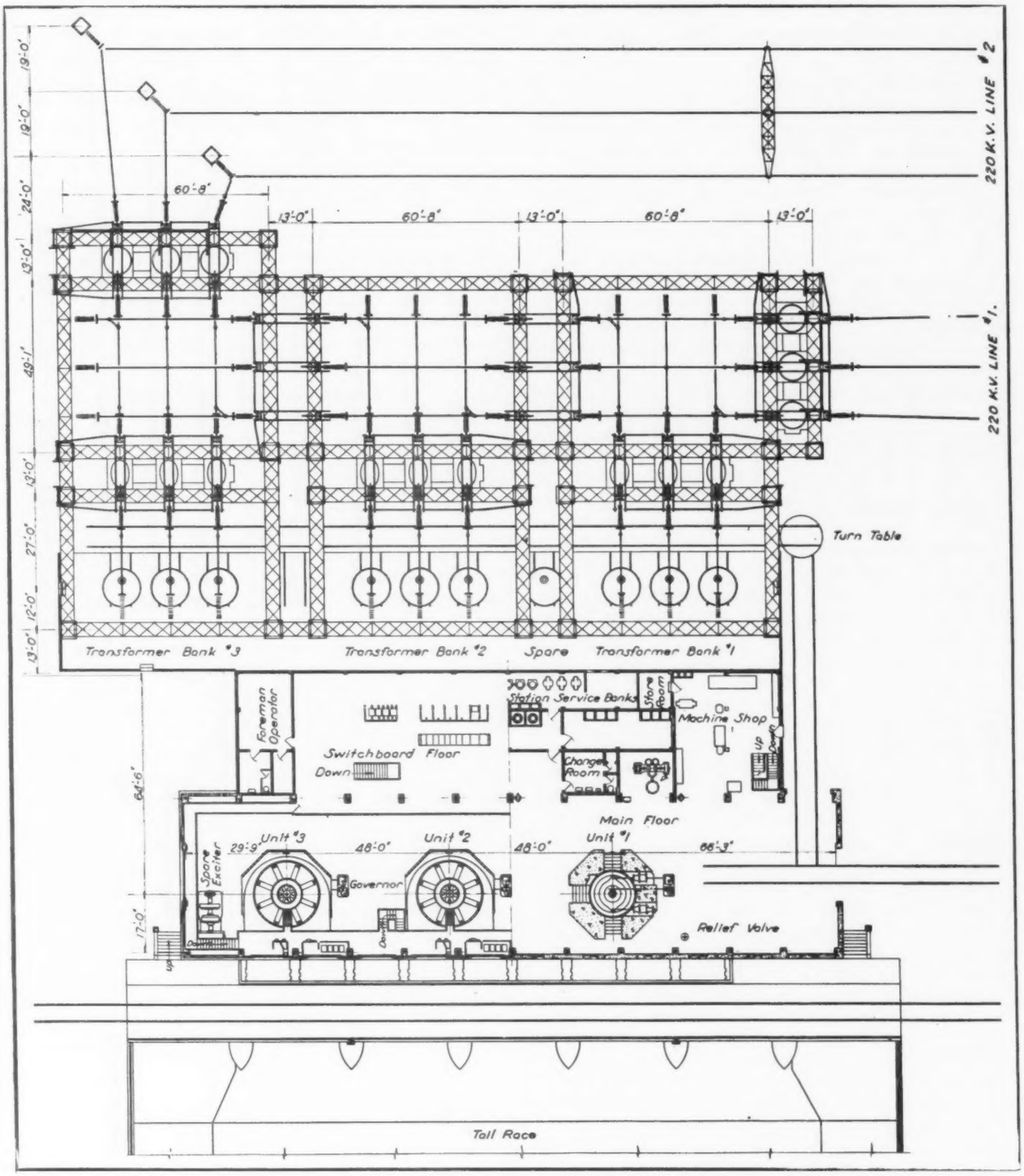


Fig. 3.—Plan view of power house and bus yard with a partial section of power house indicating arrangement on main floor beneath switchboard floor and showing section of generator pedestal.

within the machine. For additional fire protection water jets have been arranged in each machine to drench most effectively the winding.

As before mentioned each main exciter is designed to supply only its own generator. No means of interconnection between exciters is provided. Emergency exciter service is obtained from a spare set consisting of a 160-kw., 250-volt, 225-r.p.m., d.c. generator driven either by a 250-kw., 440-volt, synchronous motor or by a 275-hp. Pelton wheel. When driven by the water wheel the motor may be inverted to deliver 440-volt a.c. energy for station service during emergencies. This is a unique feature and one which serves well. No exciter switchboard has been provided. Exciter rheostats and the necessary field switches are located as near as possible to their

respective units and placed along the balcony or walkway on the tailrace side of the building. This places them where they are fully visible from the operating floor as well as from the control room, where the ventilation is good and where they are accessible. All of this equipment is remotely controlled from the main switchboard. While exciter units for any other unit without interrupting the operation of the main generator in question.

All generating units are fully controlled from the main switchboard, the operator stationed there being able to start, stop or regulate the various units in any way desired.

Six leads are brought out of each main generator in order to provide positions for current transformers to supply differential relays. The neutral leads are joined and solidly grounded through a disconnect switch immediately after they pass through the differential current transformers. Two 500,000 circ. mil copper cables complete the connection to the main station ground. Grounding switch and differential current transformers are located in a depression in the generator pedestal. Main leads from each generator are of varnished cambric cables carried in fibre ducts to the 11-kv. switch and bus structure on the second floor of the switch house.

To provide full flexibility and also to conform to what is considered best operating practice for the company's system, the 11-kv. equipment includes a full double 11-kv. bus. The bus sections for each of the three units and for the station and local service are each one complete in itself and separated from the neighboring section by an open floor space. Physical details of the the 11-kv. bus structure are shown clearly in Figs. 4, 5, 6, 7, and 8. Reference to these will obviate the necessity of a discussion here. A wiring diagram is shown in Fig. 9 and indicates clearly the metering and protective equipment. Hence a discussion of these features is likewise unnecessary.

This arrangement of the 11-kv. equipment permits synchronizing on the low tension side of the transformer banks. This is more satisfactory for 220-kv. operation for several reasons. Two of the most important of these are that the 220-kv. oil circuit breakers are much heavier and far more sluggish in operation than are the 11 kv. breakers, and that the cost of 220-kv. potential transformers is quite prohibitive when necessary solely for this purpose. Furthermore and in support of the existing arrangement is the fact that the characteristics of the 220-kv. lines often make necessary the operation

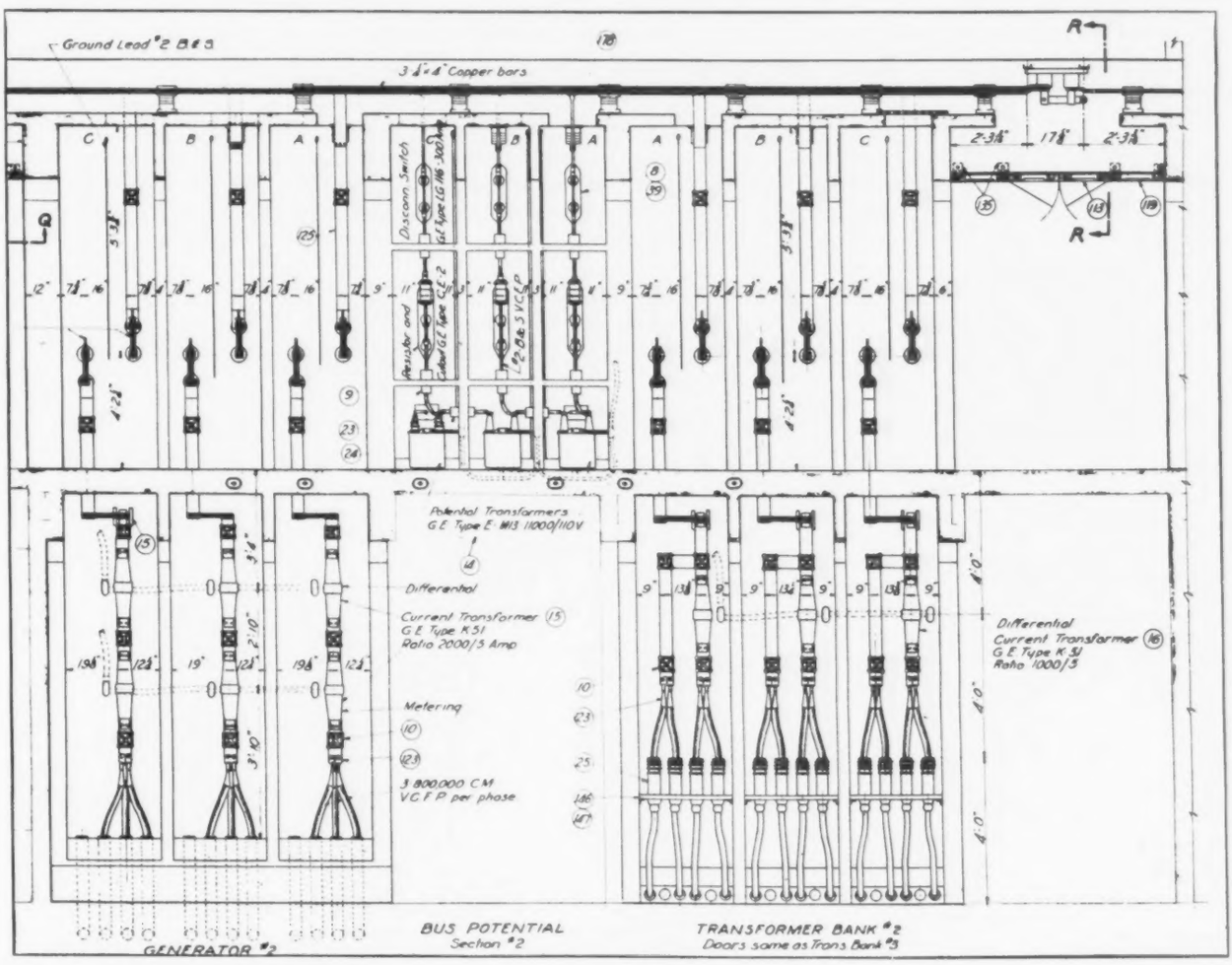


Fig. 4.—Longitudinal section through typical generator-and-transformer section of 11-kv. bus. This shows the arrangement of the cable leads, disconnecting switches, instrument transformers, main bus and bus sectionalizing switch.

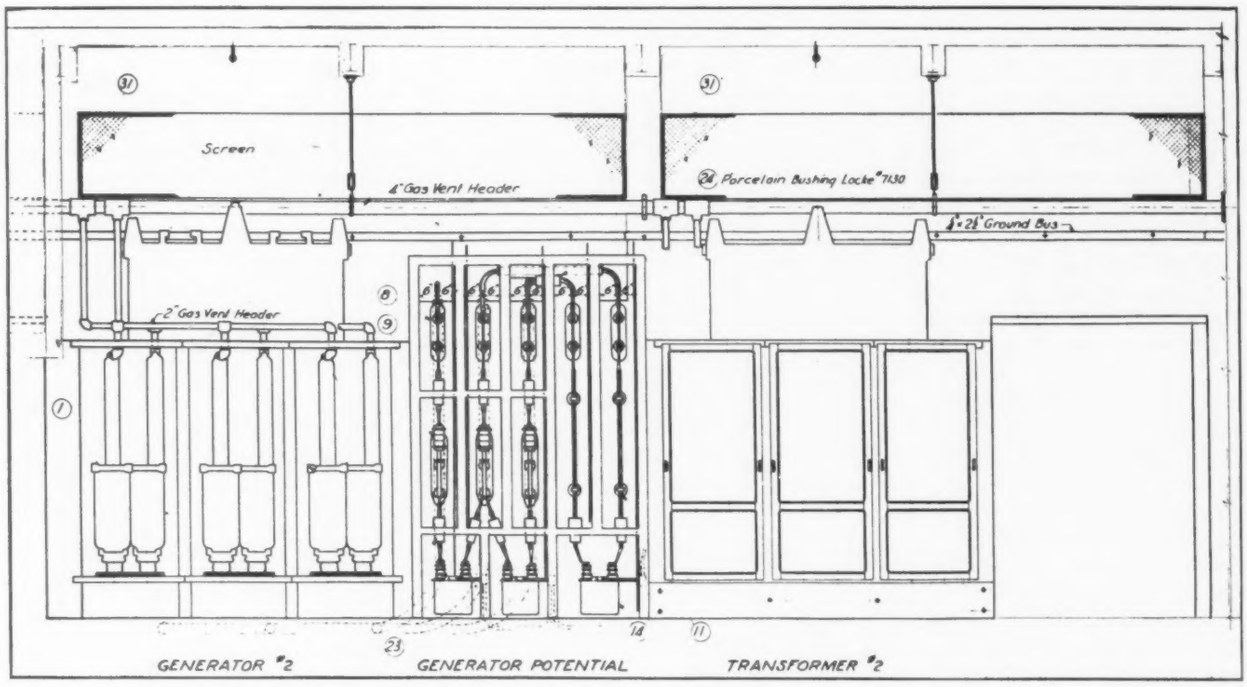


Fig. 5.—Longitudinal section through typical generator-and-transformer section of 11-kv. bus showing arrangement of oil circuit breakers, main leads, cell doors and screen wire protective covering for upper cells.

of the generators on very light fields. Under this condition they are easier to hold in step if paralleled on the 11-kv. side.

220-kv. Bus

A 27,000-kva., 11/220-kv. bank of Westinghouse transformers for each machine is situated along the edge of the 220-kv. switch yard directly in the rear of the switch house. One spare unit is provided. These transformers are oil-insulated, water-cooled, outdoor units and are connected on the high side to give a line potential of 220 kv.

The 400-amp., 220-kv. Westinghouse oil circuit breakers are not materially different from those used for somewhat lower voltages. The greatest problem in connection with the whole switching layout is the air-break switch design and layout for

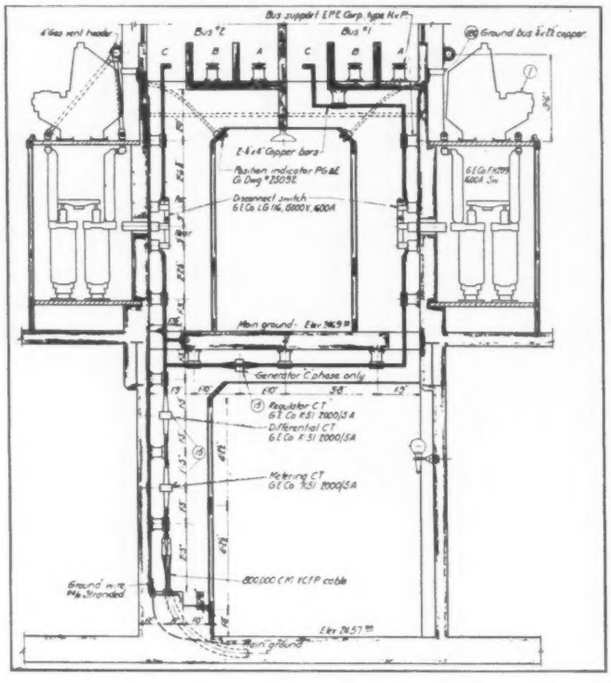


Fig. 6.—Transverse section through typical generator cell showing (below) main floor and (above) 11-kv. bus floor.

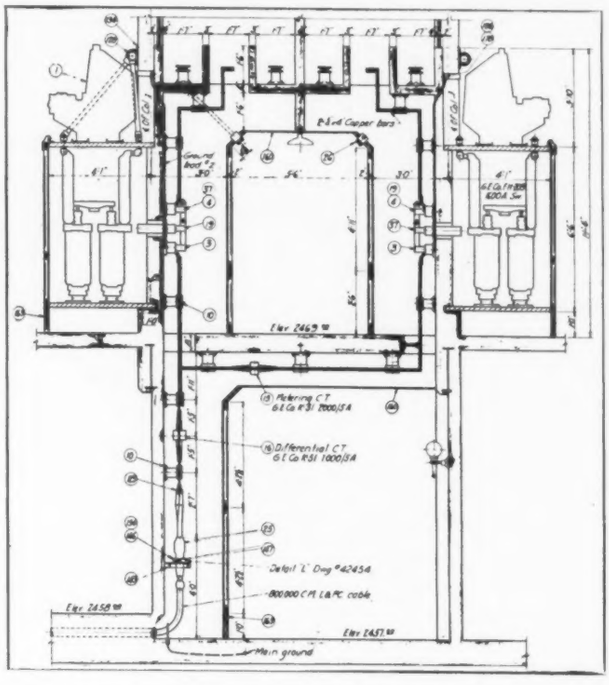


Fig. 7.—Transverse section through typical transformer cell showing (below) main floor and (above) 11-kv. bus floor.

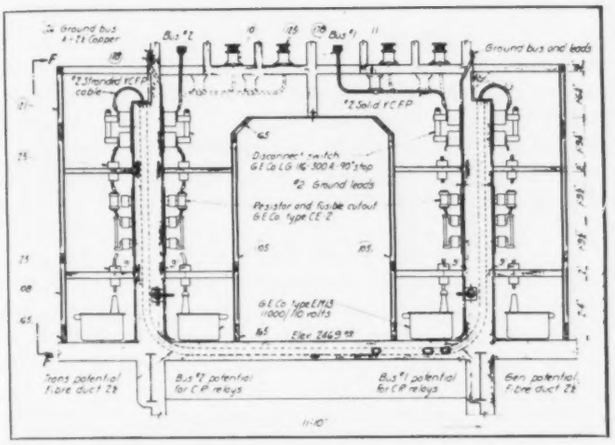


Fig. 8.—Transverse section through typical instrument tranformer cell on 11-kv. bus floor.

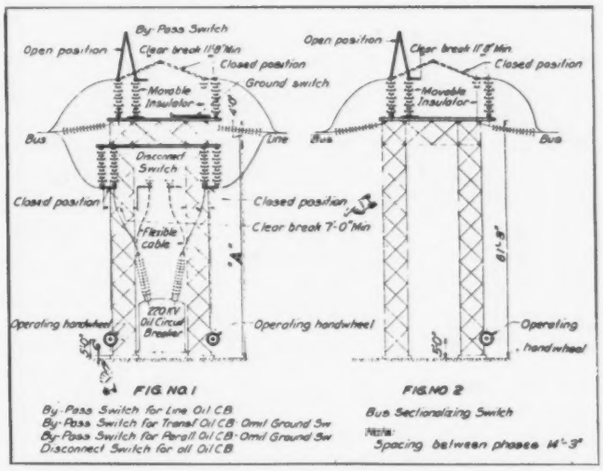


Fig. 10.—Showing arrangement of 220-kv. air-break switches.

the 220-kv. circuits. The type of disconnecting switch previously developed for the initial 220-kv. stations with a few minor improvements again was installed. These switches were built by the Pacific Electric Manufacturing Company under the supervision of the engineering department of the Pacific Gas and Electric Company. To date at least these switches in their various locations on the system have operated satisfactorily and fulfilled all the demands placed upon them. The 220-kv. by-pass switches and the disconnecting switches for the same voltage differ slightly as may be noted by referring to Fig. 10.

The arrangement of the by-pass switch consists of a stationary pivot carried on a stationary insulating pillar and another pivot carried on an insulating pillar mounted on a dolley which travels in a channel-iron track. Between these two is the jack-knife switch blade which operates in a vertical plane as the dolley is moved one way or the other to open or close the switch. An engaging clip protected from excessive corona loss by a long, bell-shaped hood is mounted at the moving end of the switch blade. A similar arrangement is provided on a third insulating pillar and forms the remaining terminal of the by-pass switch. The disconnecting switch is the more simple of the two. With this switch is was not necessary to use the jack-knife blade. Instead there are two moving clips each of which is carried on a pillar-type insulator similar to those used in the by-pass switches. As indicated in Fig. 10 the operation of

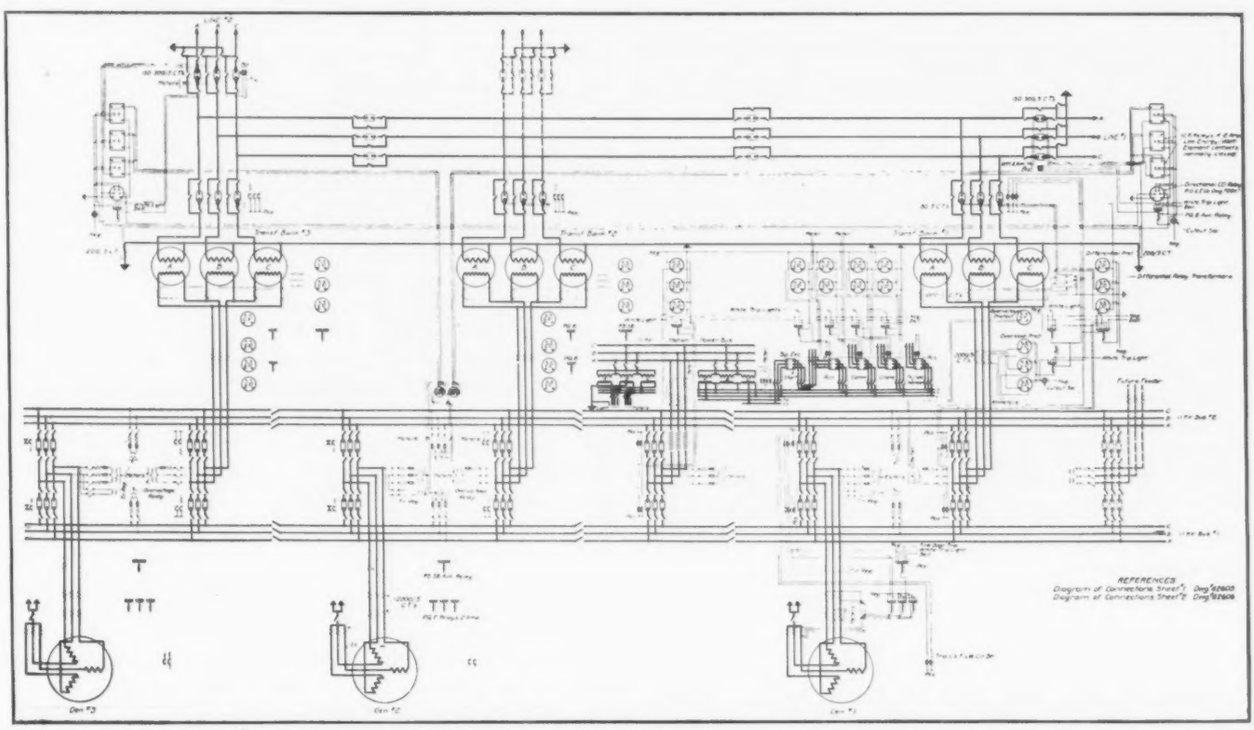


Fig. 9.—Pit 3 wiring diagram showing switching arrangements and protective relay system.

the control mechanism on these switches causes the two moving contacts to travel toward the center of the space between the two stationary terminals.

One 220-kv. oil circuit breaker per generator-and-transformer unit and one for each outgoing line provide adequate switching facilities for the flexible handling of the various generating and transmission units. Through the use of the by-pass switches it is possible to by-pass any circuit breaker without interruption to service should it be necessary to do any work on them during the hours that the plant is under load.

The 220-kv. bus structure itself is fabricated steel and arranged in one main bay. The transformers are ranged along the power house side of this bay, the leads passing overhead to the air-break switches. The three transformer breakers are ranged along the center of the structure opposite their respective transformer banks. Two transmission lines enter, one at each end of the structure. Provision for one additional 220-kv. oil circuit breaker has been made to care for future lines. This arrangement made necessary a minimum size bus structure. Steel was supplied by the Western Iron Works and the bus is equipped with Ohio Brass insulators and hardware.

Another item of interest is the method of bringing the 11-kv. leads from the building to the transformers outdoors. Lead-covered cable from the 11-kv. bus switches on the second floor of the switch house is brought out through fibre conduit laid underground. Each group of leads is carried to the proper elevation through a concrete post upon the top of which are situated Standard Underground weatherproof terminals. This is typical of the later stations of this company and is a very neat and efficient way of avoidlng the difficulties incident to an outdoor-overhead 11-kv. bus.

Transmission Lines

Connection with the main Vaca-Pit 1 220-kv. transmission lines near Burney is effected through 7½ miles of double-circuit tower line. Each circuit is carried on Pacific Coast Steel towers of the company's standard snow type. The first span from the towers at the corner of the bus structure is 2,600 ft. long and is the longest span in this section of line. Steel-core, 518,000 circ.mil, aluminum cable supplied by the Aluminum Company of America is used for the six conductors. Ohio Brass insulator units in standard strings of 13 units are used. Nine standard 10-in. disks, two special 10-in. disks, and two 13-½-in. disks together with a 16-in. metal corona shield next to the conductor comprise the standard string.

General

Pit No. 1 is provided with two 35,000-kva. generators, either of which is capable of supplying the charging current necessary for one of the transmission lines to Vaca-Dixon substation, some 200 miles

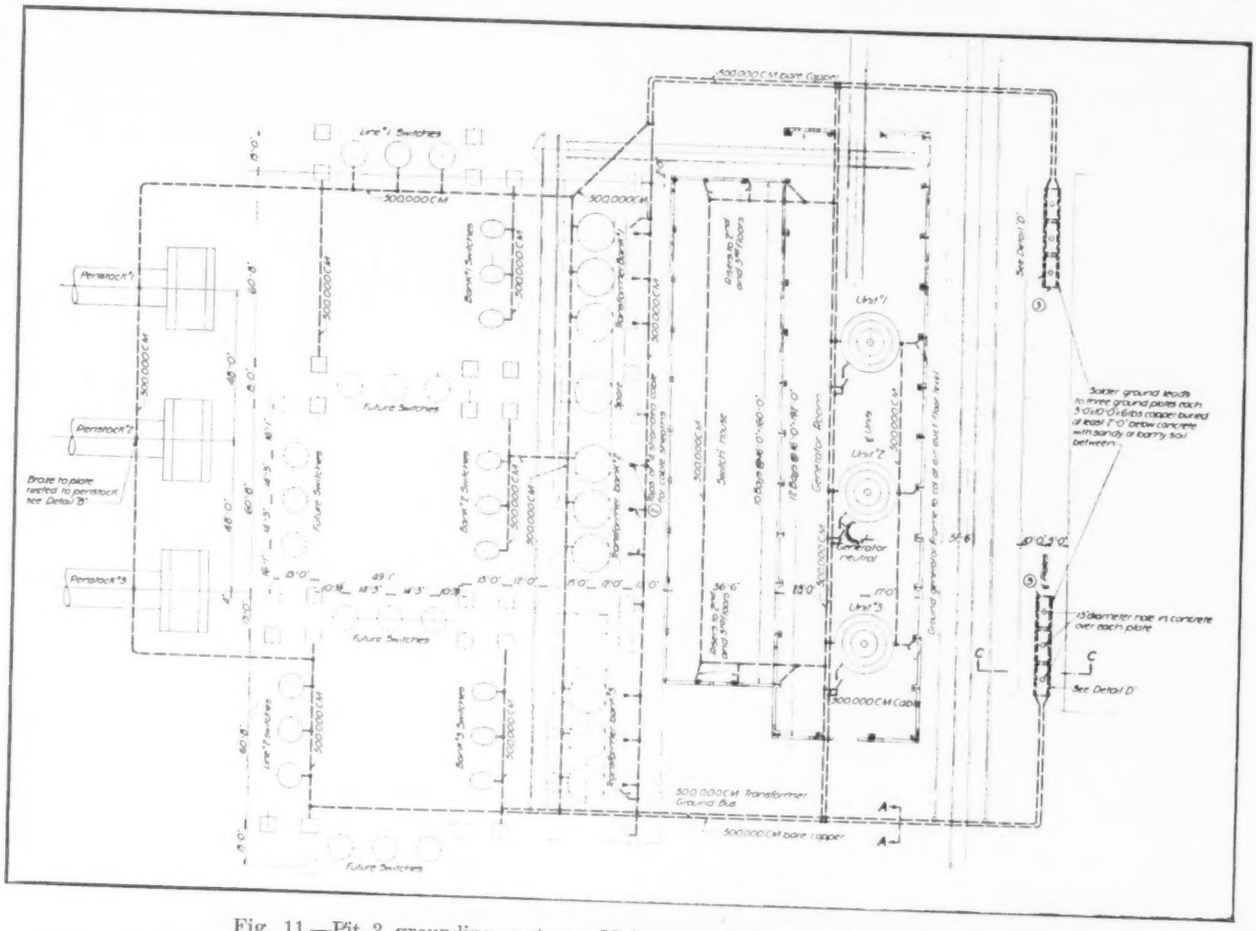

500,000 CM bare Copper
Line #1 Switches
500,000 CM
Penstock #1
Penstock #2
Penstock #3
Bronze to plate welded to penstock see Detail 'B'
Future Switches
Bank #1 Switches
Bank #2 Switches
Bank #3 Switches
Line #2 Switches
Transformer Bank #1
Transformer Bank #2
Transformer Bank #3
Ramp to 2nd and 3rd floors
Switch house
Generator Room
Unit #1
Unit #2
Unit #3
Generator neutral
Ground generator frame to rail or structure floor level
500,000 CM Cable
500,000 CM Transformer Ground Bus
500,000 CM bare copper
See Detail 'D'
Solder ground leads to three ground plates each 5'0"x10'0"x¼ thick copper buried at least 2'-0" below concrete with sandy or loamy soil between
13 diameter hole in concrete over each plate

Fig. 11.—Pit 3 grounding system. Main ground plates buried under tailrace.

away. Normal operation of this part of the system calls for the use of the Pit 1 machines for charging purposes. Hence it was unnecessary to install machines of this size at Pit 3. This made it necessary to give more consideration to other operating and economic questions in selecting the units for Pit 3. Approximately 3,000 sec.ft. of water will be available at Pit 3 during times of maximum stream flow and during the short daily peaks. The yearly average flow is 2,400 sec.ft. Studies of stream flow extending over a period from 1917 to 1922 established these facts. Studies of the best division of units led to the choice of three. Each of these is capable of operating on 1,050 sec.ft. under an effective head of 307 ft. This will be the head with usual operating conditions under which two units will be in service. Maximum tunnel flow of 3,000 sec.ft., 1,000 sec.ft. per unit, under an effective head of 280 ft. will be utilized when all three units are in operation. Under the former condition each turbine will produce 33,000 hp. and under the latter condition 29,000 hp. This arrangement provides ample operating margin to care for shutdowns.

The grounding system for all of the electrical equipment is shown in Fig. 11. A single ground system is provided to care for all station grounding requirements. Two copper grounding plates each 5 ft. wide and 30 ft. long are buried one on either side and below the bed of the tail race in permanent moisture. Separate cables run to each grounding plate providing duplicate paths to ground to insure a reliable ground in the event of failure of the lead in either path. All grounds, both from generator and transformer windings, as well as from switch and transformer tanks, penstocks, and other metallic structures are connected in on the same grounding system, and ample copper is used to insure a low resistance path for all grounds.

Usual operating practice on the system of the Pacific Gas and Electric Company calls for one hydroelectric plant to do the regulating for the entire system. Under this scheme the rest of the plants operate under block load as determined by the load dispatcher. Thus the load-limiting device in the control mechanism of each unit will be in use a large share of the time as the plant will operate as a "run of river" plant, carrying the largest block load consistent with river flow and system load demands.

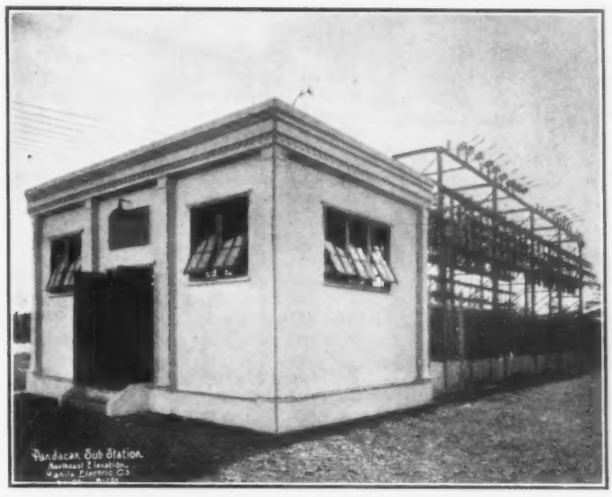
Three operators per shift is normal for Pit 3. The first operator is stationed at the control board where he can control directly most of the electrical equipment of the entire station. He is in charge of the station. The second operator has no set station, but is subject to the direction of the first operator. The operation of all disconnecting switches under the directions of the first operator falls to the lot of the second operator. Entire care of the turbine and the operation of the necessary valves to prepare the turbine for operation or shutdown is the duty of the third operator whose station is on the turbine floor where he can keep watch of his machinery. Other miscellaneous machinery also comes under the care of the third operator.

Construction work on the 4-mile tunnel actually was started Aug. 5, 1923. Preliminary operations were started on the sites of the power house and the dam Dec. 1, 1923. Concrete first was poured at the power house July 9, 1924. Almost exactly one year after this date the first unit was first turned over, and it was with justifiable pride that the engineering department and the construction department of the Pacific Gas and Electric Company presented their latest achievement to the operating department of that company.

Manila Electric Company's Substations Arouse Favorable Comment

EMPHASIS on the importance of sightly buildings with well kept grounds is made in a letter from a reader connected with the Manila Electric Company, Manila, P. I., describing one of the substations of that company. Portions of the letter follow:

"In connection with your editorial in the May 15 issue of the Journal of Electricity under the caption,



Pandacan Substation of Manila Electric Company

'Beautification of Properties as a Phase of Public Relations,' we call your attention to the enclosed photograph of our substation at Pandacan, which is one of five similar ones in our system. These buildings house control switchboards, feeder regulators, etc., and in one case, in a larger building of the same type, a rotary converter.

"Many favorable comments have been received on the appearance of these buildings, and we feel that certainly there is nothing about them to frighten away prospective investors in the company's securities either because they are unsightly, or, on the other hand, too ornate and expensive. They are of reinforced concrete throughout, and very little added expense occurs due to the simple decorative features employed."

The trim appearance of the substation shown in the photograph furnishes excellent grounds for favorable comments. Buildings of simple architectural style in appropriate surroundings cannot help but be an asset to any company.

IDEAS FOR THE CONTRACTOR

THE
ELECTRAGISTS of SAN DIEGO
WELCOME
THE SOUTHERN DIVISION OF THE
CALIFORNIA ELECTRAGISTS
TO OUR CITY
ELECTRICAL SERVICE
THIS TRADE MARK
Electragist
IS YOUR ASSURANCE OF SAFETY
O. W. KARL
ELECTRAGIST
2188 Logan Ave. Phone M. 1182
J. F. ZWIENER
ELECTRAGIST
1224 3rd St. Phone 633-51
C. C. CLARDY
ELECTRAGIST
1017 Market St. Phone 686-20
SMITH & DODGE
ELECTRAGIST
816 F St. Phone M. 354
E. R. DAMARUS
ELECTRAGIST
3444 Granada Phone Hill. 3436-W
AN ELECTRAGIST
advocates and upholds at all times the following high standards of business practice—
He uses only high grade and standardized materials, knowing that inferior products cannot be serviced properly, and will not meet the needs of the public
He does quality work in every detail of the job. In all of his transactions he specifies quality, which is an assurance of safety both in installing and merchandising.
His servicing is dependable and trustworthy. No matter how big or small the job, he does it to the satisfaction of the customer. He competes fairly.
He upholds the National Electrical Code. Never will he knowingly skimp a job or make an installation not in accord with the underwriters' rules. He realizes that violations are costly and reflect on his ability.
The contractors and dealers represented on this page are the only firms in San Diego who have met the strict requirements of the Association of Electragists - International, formed in 1921.
CALIFORNIA ELECTRIC WORKS
ELECTRAGISTS
800 F St. Phone M. 272
MAYER & BOYCE
ELECTRAGISTS
644 7th St. Phone M. 1853
INDEPENDENT ELECTRICAL CO.
ELECTRAGISTS
928 7th St. Phone 654-12
SOUTHERN ELECTRICAL CO.
ELECTRAGISTS
3rd and E Sts.—7th and Broadway
Phone Main 4730
The San Diego Consolidated Gas and Electric Co.
join in the welcome
to the California Electragists,
Southern Division
FOR DEPENDABLE
ELECTRICAL CONSTRUCTION AND MERCHANDISE
DEAL WITH AN ELECTRAGIST
YOUR ASSURANCE OF SAFETY

Copy of advertisement used by San Diego Electragists to welcome members to the city and also to tell the public something of the business ethics advocated by Electragists

THE ELECTRICAL CONTRACTOR

By S. W. LEAVER

I've followed this little old 'lectric game for nigh on to twenty year,
I've had my ups and down just the same as you all must have had that's here.
I've made some good money and spent some more, and I've worked with the tools myself,

I've kept my own little retail store with a nice, clean stock on the shelf.
I've figured some jobs by guess and by rule, I've tried both the old way and the new,
I've weighed and measured and guessed like a fool and I've counted each socket and screw.

I've allowed for the overhead—heat, light, and rent; not an item I've missed I'll be bound,
But when I've collected the very last cent there's never enough to go round.
So I have decided this contracting game is not a safe one to be played,

I'll work just as hard and figure the same, but some profit has got to be made.
Hereafter my bid for every blamed one, I don't care for whom it may be,
Will be all of my costs for the work when it's done, plus a nice little profit for me.

And now to you fellows still trying to live on the profits you never have made,
Just a piece of advice let an old timer give, 'cause he's through with the game as it's played.
Quit guessing at prices and labor that's lost and hoping 'gainst hope you'll push through,
Take all future jobs on a basis of cost—plus a nice little profit for you.

Advertising Used in Welcoming Electragists to San Diego

In welcoming the electragists of the Southern Division of the California Electragists to the city at the time of their quarterly meeting, the San Diego electragists made use of a full-page advertisement in each of three papers.

They also took this opportunity to tell the public something of the business ethics which are advocated by electragists. Among these were included the use of high grade standard materials, quality work, dependable servicing, and the upholding of the National Electrical Code. In the advertisement they also announced their individual affiliation with the Association of Electragists, International.

The members of the local association in that city are firm believers in the value of advertising and feel that it affords an excellent means of selling the public the idea of having an electragist serve their electrical needs.

Bachelor Has Complete Electric Home Built for Himself

An unusual electrical home recently was completed in Cotati for R. J. Beck by H. W. Jacobs, Santa Rosa electragist. Although Mr. Beck is a bachelor, he believes in enjoying the comforts of a thoroughly modern home, which is completely electric. The heavy-duty electric equipment in his home includes a 5-kw. Wesix water heater, six Wesix flush-type air heaters and two portable ones, and a Hotpoint-Hughes super-automatic range. Besides these, he has an electric sewing machine, washing machine, iron, waffle iron, toaster, percolator, drink mixer, and a radio.

Mr. Beck does not stop with having a complete electric home, however, and has his chicken yards electrified, including electric incubators, brooders, feed mixers, outside lights, and pumping plant. The installation has been very satisfactory and Mr. Beck is an ardent advocate of more complete electrification of farms and homes.

Standard Symbols for Wiring Plans Distributed to Electragists.—The A-A Wire Company of New York recently has had a chart prepared showing the "Standard Symbols for Wiring Plans" as recommended and adopted by the Association of Electragists, International, The American Institute of Architects, and the American Institute of Electrical Engineers, and approved by the American Engineearing Standards Committee. The chart is mounted on beaver board in attractive form. It is being distributed by the A-A Wire Company to all members of the Association of Electragists, International. This chart will be particularly advantageous to contractors when drawing plans. Its distribution is one of the many ways in which manufacturers and jobbers are cooperating with the members of the association.

Neighborhood Meetings an Aid to Contractors

Unusual Procedure Inaugurated by Electrical Contractors in Los Angeles Producing Effective Results

By J. R. WILSON

The Electrical Contractors and Dealers Association of Los Angeles recently has evolved a very unusual method of solving the problems confronting electrical contractors in the city by having neighborhood meetings in different sections of the city to which all contractors are invited. Estimating methods, cost accounting and similar subjects are discussed at these meetings.

Previous to Sept., 1924, the conditions in the electrical contracting business in Los Angeles were about as bad as could be found anywhere. The license fee to do electrical contracting was only $50 per year with a nominal bond. Los Angeles has conditions to contend with that probably no other city in the country must face. A great many people come from the East to enjoy the climate and other attractions and arrive with a very limited capital. If they do not get employment in a short time after arriving, they decide to go into business. Owing to these conditions, the electrical contracting field was very much overcrowded, there being over 800 registered electrical contractors. The result was that no one was making any money, and the public was suffering from incompetent, unreliable contractors.

The members of the Electrical Contractors and Dealers Association got together to canvass the situation and see what could be done to better conditions. After a number of lengthy meetings it was decided that the solution lay in weeding out the undesirable contractors and safeguarding the public by requiring all electrical contractors to pass an examination given by the electrical inspection department. To protect the public further, each contractor was required to post a surety bond of $1.000, and the license fee was raised to $100 per year. All contractors, including those who had been in business for fifteen to twenty years, were required to go through the same procedure before they could do business.

After presenting the facts to the city authorities, the necessary ordinance was drafted and passed as a safety measure to life and property. It was only a short time until the number of electrical contractors was reduced to less than half of the number previously registered.

Through a mistaken idea of the relation of volume to profit, a majority of the bungalow contractors seemed to think that because they were paying a larger license fee they must do a much larger volume of work regardless of profit. This led to deplorable price-cutting, with outlets being figured at anywhere from $1.95 to $2.65 each, and in most cases the service wiring, meter loop, and electric bells were included free. (Editor's note: All wiring in Los Angeles must be in conduit.) Of course a condition like that could not exist for any length of time, and the results were soon apparent by the number of electrical contractors who were failing in business. While all these things were taking place the association continued to grow slowly, taking in a new member now and then, among these being J. Arthur Curtis, by his own definition a typical "curb-stoner".

Mr. Curtis has been largely responsible for many of the changes that have occurred. Previous to becoming a member of the association, he had given a great deal of thought to the conditions existing in the business. His line of reasoning led him to the conclusion that the problem would not lend itself to solution in its entirety but must be attacked purely as a neighborhood proposition. The Los Angeles territory is too large and the number of men concerned were too many ever to get them together at any one time. It seemed to Mr. Curtis that he could best work with the men whom he met in direct competition. Everyone he talked with agreed that the business was sick and needed doctoring. He conceived the idea of having them meet at his store to see what could be done.

The topic for discussion at that first meeting was "What is your cost of doing business?" The results were gratifying and it was decided unanimously to hold the meetings each week thereafter. The members of the association grasped the significance of the neighborhood meeting idea and the simplicity of its operation, and it was discussed from all angles.

In all branches of industry only those movements succeed which have the backing and strength of the associations behind them. So with the neighborhood meeting idea—it required the backing of the Electrical Contractors and Dealers Association to be a success. This was the unanimous opinion of those interested; it was agreed that to succeed in the highest degree it was necessary to formulate a plan that would be holeproof; also to place the responsibility for the operation of the plan on the shoulders of men who were known to be experienced in handling meetings. As the association was already functioning, it was only natural at the beginning that the machinery of operation should be controlled from their headquarters.

William Brainerd of the California Electrical Bureau in Los Angeles had been devoting a large amount of his time to educating the local contractors along the lines of better merchandising, cost finding and cooperation.

After due consideration having been given to all the elements which entered into the proposition, the following plan was adopted as best suited to the existing conditions: Mr. Brainerd was already in the field and was known to the majority of the contractors; he was also familiar with the general territory in which each man operated. At his suggestion a large size map of Los Angeles was obtained and the city was divided into eight districts of neighborhoods.

The executive committee of the association then chose an active association member, whose place of business was located in that district and appointed him temporary chairman for the district. A movement of this kind must be operated on absolutely nonpartisan lines. This fact was recognized and it was agreed by all parties that the association must be relegated to the rear, at least temporarily.

The solution of the problem to be met required the services and the ideas of every electrical contractor in the territory. The thought of the non-member was just as essential as that of the association member. There were more contractors outside of the association than were in, and the problem was a community affair.

The temporary chairmen were expected only to call on the contractors in their district, arrange the time and place of the first meeting, and then probably be succeeded by some non-association contractor as chairman. The first few meetings were rather hard to get started as most of the men were meeting their competitors face to face for the first time. Each man was given an opportunity to express his opinion as to what was wrong with the business and to advance a possible remedy. The mjority were of the opinion that the work was being taken too cheap, but as long as John Doe did it they had to do the same.

The first meetings served to get the contractors acquainted with each other. The executive committee decided that the chairmen of each section should meet each Tuesday noon at lunch and district problems should be offered for solution at that time.

It was decided to hold a general open meeting inviting every electrical contractor in the city to attend. For this meeting the following program was adopted: Invitations were sent to every electrical contractor in the city, and a reception committee met each one as he entered and had him register, at the same time giving him a copy of the Electragists' estimating sheet.

Each district chairman was responsible for the attendance from his section, and approximately 75 per cent of all the contractors were present. The district chairmen gave a number of talks at this meeting including the following subjects: Cooperation, possibilities of neighborhood meetings, estimating, and the necessity of organization work. This meeting was a success, and it was decided to hold one general meeting each month.

The activities had progressed so satisfactorily that it was decided to employ a regular field man. His duty is to interview contractors in each section, investigate reported unethical conduct, and to work with members in teaching them cost-finding. To finance this plan the association allowed those wishing to become members to join for the nominal dues of $5 per month, all moneys so collected being deposited in a special fund for organization purposes only. The association contributed $200 to establish this fund.

A committee on cost-finding gathered figures pertinent to costs of materials and labor on outlet work. The committee realized that the method of estimating by outlets was about the poorest method of estimating that could be used. They also realized that the smaller contractors did not have the time accurately to estimate each job on a quantity basis. However, they felt that if a man kept accurate job cost records and his price per outlet was high enough, the law of averages would give him a reasonable margin of profit on business taken by this method.

The plan is showing satisfactory results; the morale of the majority is high, and some contractors who never made money before are now discounting their bills.

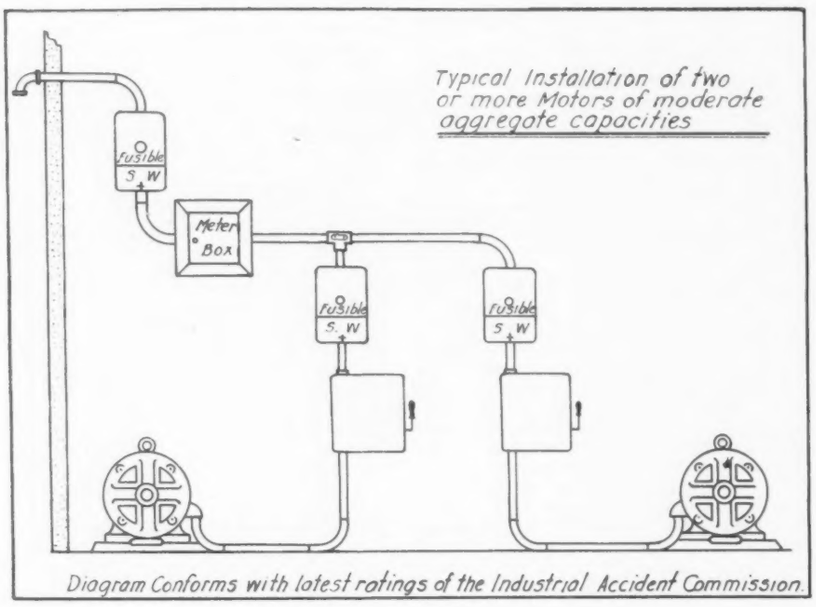

Typical Installation of two or more Motors of moderate aggregate capacities
Fusible S. W.
Meter Box
Fusible S. W.
Fusible S. W.
Diagram Conforms with latest rulings of the Industrial Accident Commission.

Fig. 3

Safety-First Installations for the Electrical Contractor

The Aug. 1 issue of the Journal of Electricity (p. 96) contained a discussion of a single motor installation when the motor is not within sight of the operator. This was the second of a series of five which will show five different types of installations commonly made by the electrical contractor.

Fig. 3 shows a typical installation of two or more motors of moderately small capacity. It will be noted that as in Figs. 1 and 2 the service is brought directly to the fusible disconnecting switch just above the meter box and then led to the fusible disconnecting switches ahead of the starting equipment for each motor.

Again, it will be seen that all equipment is in sight of the operator and any piece of apparatus can be worked with perfect safety provided the operator watches to see that he has a dead circuit through the disconnecting switch of the circuit he intends to work on.

This same installation may be carried on for as many motors as the installation requires.

Closed-Shop Agreement Illegal Ohio Supreme Court Rules

The Supreme Court of Ohio recently ruled that a closed-shop agreement, when taking in an entire industry and operating generally in a community so that it prevents or deters men from working, is illegal. Ohio now follows the settled rule laid down in the courts of many states, including New York, New Jersey, Connecticut and Massachusetts.

The language of the Ohio court follows: "Contracts by which an employer agrees to employ only union labor are contrary to public policy, when they take in an entire industry of any considerable proportions in a community, so that they operate generally in that community to prevent or seriously deter craftsmen from working at their craft, or workmen from obtaining employment under favorable conditions without joining a union."—National Bulletin, Association of Building Trades Employers. The ruling of the Supreme Court of Ohio as given above is important from the standpoint of the electrical contractor, as similar agreements frequently are advocated.

Street Lighting Model Used to Sell Better Installations

One of the most interesting exhibits in connection with the recent N.E.L.A. convention was the street lighting model loaned by the Edison Lamp Works to the convention for the purpose of arousing interest in street lighting. This model was designed and constructed by B. Audsley; the wiring and illumination effects were designed and installed by T. P. Brown, both of the Edison Lamp Works.

It is often so difficult for lay people, and even for those interested in street lighting, to visualize their local streets under different intensities of lighting. This model was constructed to supply that visualization. The buildings along the street are all representative buildings of a typical American business street, and have been constructed to the scale of ⅜ in. to 1 ft. The wiring and lighting devices have been so arranged that it is possible to make the street bright enough for a town of 5,000 population, or of 5,000,000 population, or of any size in between. By a single turn of a switch it is possible to give any desired spacing of standard with any desired size of lamp, thus allowing a lighting company, or some city fathers, or a group of merchants, to see how their street looks at present and how it can be made to look with larger sized lamps. In fact, there are some 200 different combinations of street lighting in the model.

Of interest also to the merchant is a visual story showing how they can increase the number of window shoppers by increasing their show window lighting.

Sign lighting also is treated. There are seven different types of signs, each having its own particular appeal and each telling its own story.

Traffic control is a serious problem on every busy street. In fact, no business street can function properly without traffic regulation. This model shows a type of traffic flashes, as well as a traffic director.

Floodlighting, affording a means of keeping a building beautiful and visible twenty-four hours a day, is shown on the model where a splendid municipal building is bathed in white, red, amber, blue and green. The model is the property of the Edison Lamp Works and will be returned to the permanent display of the Edison Lighting Institute, Harrison, N. J.

Left: Street lighting model demonstrating the effect produced with 1,500 c.p. lamps placed 75 ft. apart. Right: Triple light standards which create a lighting system which is artistic, adequate and in architectural harmony

Letters from a Secretary to a Self-Made Contractor

The Second of a Series of Communications from a Man of Experience to His Friend Just Starting Out

San Francisco, Calif.

Dear Bill:

I am glad to hear that you are off to a good start and that you are happy in your new business. After all is said and done, the best thing we get out of life is the happiness that comes from legitimate endeavor and the satisfaction that accrues from a good job well done. You may remember the lines from Shakespeare in which he says, "The evil men do lives after them; the good is oft interred with their bones." It therefore seems incumbent upon all of us to devote our time and effort to the pursuit of good things in order that there may be no evil to live after us.

This business of doing good includes so many things that it is difficult to pick out the most important. Some men consider that by being kind they have filled the bill and others feel that they have complied with the requirements when they have been good to themselves alone. My idea of the thing, perhaps because I am in contact with so many men in our line of work and consequently get so many different personal views, is that really to do good we first must consider our neighbor. This consideration of a fellowworker includes respect not only for his feelings but also for his business. Anything that we do that interferes unduly with his legitimate endeavors to make an honest living is, in my mind, an act of evil.

Perhaps this view of the situation as applied to the electrical contracting business never has appealed to many members of the industry. Surely by no other line of thought can I lead myself to believe that many of the existing conditions could be brought about. If all members of the contracting business would consider their actions as applied to themselves I am sure that many of the things that now happen could never occur. Price-cutting is certainly a form of evil and it hurts the price-cutter more, in the long run, than it hurts his competitor. The proof of this is in the long list of men, many of them with good intentions, who have gone down to a quick business death through the means of the low-priced job. There are still others who have failed because they refused to stand shoulder to shoulder with their competitors for the betterment of conditions. There are many trade associations today, in the electrical business particularly, and they are generally in existence for only one purpose—the good they can do through their assistance to their members. The association of which I have the honor to be an officer is one of these and the state association is another. I can only hope that you will lend your support, both financial and personal, to both of these organizations. I can just hear you asking "Why"? as you read this. I'll tell you why.

How many times have you leaned back in your chair and thought—what can I get out of membership in the local or state association? What are the benefits that I am not already receiving? Is it worth the dues they ask? My answer is this: You will get out of it proportionately what you put in.

The man that puts love, kindness and cooperation into his daily home life usually is repaid an hundred fold. So it is with your business associations. Goethe has said, "Kindness is the golden chain by which society is bound together."

Attend the association meetings, not with a chip on your shoulder, but with a smile and a spirit of friendliness toward your competitor. He is in the business for the same reason you are—to make an honest living. Listen to his story and extend him a helping hand in his hour of need. Business without competition is poor business.

Attend the meetings and exchange the experiences you have had with your jobber, with the electrical inspector, and with the power company. They will probably have representatives there to take up your problems affecting their branch of the business. Learn what the other fellow's difficulties are and profit by his experience. Don't be a hermit. No man succeeds without friends—friends in his own line of business. Learn to play with your competitors just as when a boy you learned to play with your competitors in the school yard. We are only grownup boys today, and we must not forget how to play and to be kind to one another.

You ask, why must I belong to the association and pay dues to receive these benefits? Because it is through the association office that meetings are arranged and important subjects laid before the members for consideration. At these meetings the successful men, the men who have "been through the mill", deliver their messages and exchange ideas with you. Association membership should be a part of your life and of the life of every contractor-dealer. Life is an educational function and by taking the association into your life you will increase the benefits you will receive from living. We are never so far advanced that we cannot learn something from our business associates and our competitors. What we do learn we can all of us apply to our particular and individual business.

Just single out the successful men, the men that last in your line of business, and ask them what they think of membership in the association. Invariably their answers will be to this effect, "My success began with membership and regular attendance at the association meetings". The association is the "clearing house" of the contractor-dealer branch of the industry. It is the hub around which the wheel of progress revolves.

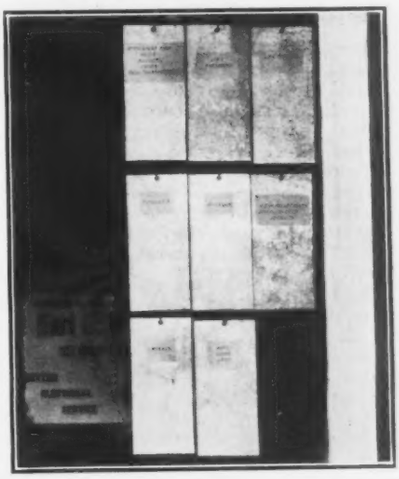
The jobbers are well organized, the manufacturers, and so are the power companies. Why, then, should the contractor-dealers be the weak link in the business and continue indefinitely to take dictation from others? "In unity there is strength." If your association should do nothing else than to show you how to work for yourself instead of for the general contractor, it would repay you an hundred fold for all the time and money you might put into it. I sincerely hope that I shall hear from you as an active and constructive worker for your local and state association.

Sincerely and electrically yours,

JOE MAGEE.

Holders for Prices of Material Sold Over Counter Save Time

As a means of having readily available the retail prices for materials most frequently sold over the counter, F. P. Schweiger, foreman for Earl G. Wilson of Napa, has designed a number of galvanized iron holders in which removable sheets are inserted containing the desired information. The holders are made of ordinary galvanized iron with the bottom and sides turned under so as to form a container 5¼ in. by 11½ in.



Holders containing retail price sheets for materials frequently sold over counter

The various classes of materials are grouped together. Separate containers are provided for switches and porcelain; wire, cord and loom are in one group; as are attachment plugs, bells, buzzers, fuses and bell-transformers. Any number of such classifications could be made, depending upon the needs of the individual contractor. The prices on the materials are kept up to date by Mr. Schweiger. These cards are placed in a convenient location at the end of one of the material shelves, as shown in the accompanying picture.

BETTER MERCHANDISING

Merchandising a Complete House-Wiring System

G.E. Merchandise Division Is Conducting Drive to Sell Entire Wiring System as a Single Unit

Better house-wiring through the use of a nationally known and trademarked wiring system is the aim of one of the most aggressive sales programs ever attempted by the electrical industry. Toward this end the General Electric Company, through its recently organized Merchandise Division, has entered into a national advertising campaign to stimulate the demand for the "G. E. Wiring System—for Lifetime Service."

The campaign was inaugurated in January of this year with the insertion in a large number of magazines, periodicals and trade journals of advertising calling attention to the value of the "G.E. Wiring System." The advertising was directed toward home owners and builders, architects and the members of the electrical contracting industry. Realizing that a different message was necesary for each type of reader, the company used an individual type of copy in each advertisement. To tie all of the advertisements together, all of those appearing approximately simultaneously carried the same illustrations, despite the fact that the copy was directed toward a particular class of reader.

As one of the first adjuncts to this advertising campaign, the company prepared a 40-page illustrated booklet, "The Home of a Hundred Comforts." This booklet was featured in the advertisements directed toward home owners, and to avoid the distribution among only idly curious persons a small charge was made.

The booklet, written in a conversational style, takes the prospective home owner into the house by the front door, and after telling of the advantages of a complete wiring system, explains in detail the proper wiring practices to make "The Home of a Hundred Comforts." The reasons for each lighting outlet and switch are explained, and at the same time the advantages of the particular method of installation are shown. The location of and the reason for convenience outlets are portrayed vividly, and the prospective owner is shown how each member of the family will benefit by the installation of an adequate wiring system. In the kitchen, particularly, great stress is laid upon the convenience that accrues to the housewife through the use of electrical devices when proper preparations have been made at the time that the house is wired.

From the first floor the reader is taken to the second where the advantages of a well planned wiring system are explained. From there the text leads to the cellar and garage, showing the necessity for adequate wiring in those portions of the home that often are forgotten because naturally attention is paid to the parts of the house that are used more frequently.

To present even a more vivid picture to the prospective owner the booklet contains isometric drawings and outlet diagrams of both the first and second floors of the house. The conduit runs, together with the exact location and type of outlet, are specified on the diagrams, and in the attached text key figures indicate the type of wiring materials best adapted to the installation. In addition, two alternative sets of specifications are presented, giving the reader slightly different suggestions for the wiring of the house. As the booklet states, the specifications suggested are by no means the only combinations that could be employed under the "G.E. Wiring System," as the system could be adapted to any house that the builder might erect. The purpose of the book, then, is to stimulate the desire for adequate wiring and not to specify the manner in which the work should be done.

Following the description of the wiring system, the booklet informs the reader of the purposes of the "G.E. Wiring System," which it states is a "system of house-wiring embodying adequate outlets properly placed, conveniently controlled, and using G. E. materials throughout." Then follows a description of the materials used under the system sponsored by the company.

That the house owner may know of the smal cost of operating electrical devices, one of the pages of the book is devoted to a tabulation showing the hourly operation cost, the energy cost being figured on a basis of 10 cents per kw-hr.

While the booklet is being distributed from the offices of the Merchandise Division at Bridgeport, arrangements may be made for distribution by local electrical contractors desiring to stimulate interest in the "G.E. Wiring System."

From the description of the booklet it may be seen that the purpose of the company is to advertise a wiring system and not individual parts of the system. One of the main purposes of the entire advertising and selling campaign is to build up the standard of wiring and encouraging the use of General Electric Company materials. Another aim is to instill confidence in the mind of the builder to the end that he will feel it unnecessary to worry about the individual items in the house-wiring system, but instead will rely upon specifications set down under the "G.E. Wiring System" and thus specify this wiring system by name.

The plans as prepared by the Merchandise Division of the company also provide for extensive services for the aid of architect and electrical contractors. Two of the most important of these are "Electrical Specification Data for Architects" and "Electrical Specification Data for Contractors." These booklets will be ready for distribution about Sept. 1.

The architects' book, designed to assist architects in the preparation of house-wiring specifications, is divided into five sections. Each section covers a particular group of houses being classed acording to the residence valuation as follows:

Group	Residence valuation
1	$ 6,000 to $12,000
2	12,000 to 18,000
3	18,000 to 25,000
4	25,000 to 35,000
5	35,000 to 50,000

For each of these groups a simplified form of wiring specifications is presented, the form for the specifications being prepared, making it possible for the architect to copy the form and transmit it to the contractor. To present visually to the architect the type of equipment he is specifying under the "G.E. Wiring System," most of the materials entering into the job are illustrated in the booklet. After the specifications have been written acording to the form in the booklet, all that is required is that the architect indicate the location of the various outlets on the drawings for the house. Mounting heights for all outlets are specified in the form. The "G.E. Wiring System" contemplates an all-metal rigid and flexible conduit installation.

The contractors' booklet, while similar to the architects', goes into more detail in giving the character of the materials to be used on the job. Methods of installation are suggested in order that the work may be done in the most efficient and satisfactory manner.

To assist the electrical contractor the Merchandise Division of the company has prepared a proposal form and an estimate sheet. The proposal form is padded and is to be filled out in duplicate by the contractor. On the form are spaces for the listing of all of the outlets that will be installed in the house, these outlets being segregated as to location and type. The estimate form, slightly larger than the proposal, is made up of eleven different items covering the estimated cost of the work to be done. Alongside of the space for estimated costs are columns for the actual costs. Two more items permit the estimator to list the total estimated cost and profit. The estimate sheet covers the job from the roughing-in to the lighting equipment incidentals.

Both the proposal form and the estimate sheet were prepared by the company following several months survey in which the needs of the contractor

doing house-wiring were ascertained. The systems comprise a combination of the most satisfactory forms used by a large number of contractors.

Another aid that has been prepared for the use of electrical contractors is the "G. E. Wiring System" job card which, when imprinted with the contractor's name, is to be placed on houses that have been wired throughout according to the specifications of the company's system. These cards, in common with the rest of the material prepared by the company, are designed to call attention to the entire system and not individual pieces of wiring equipment. A small folder giving the important points in connection with the "G. E. Wiring System" also has been prepared for contractors' use. These folders may be imprinted with the contractor's name and distributed to his prospective customers.

The entire activity in connection with establishing in the public mind the "G. E. Wiring System" is being conducted under the Merchandise Division of the General Electric Company. This part of the company was formed recently to take over activities of the Merchandise Department, which was organized about three years ago to merchandise that portion of the company's products that were sold through jobbing houses.

The new Merchandise Division is a decentralized organization within the General Electric Company maintaining its factory and executive headquarters of its sales, manufacturing, accounting, credit and collection departments at Bridgeport, Conn. The Division is headed by George P. Baldwin, general manager, and H. C. Houck, assistant general merchandise manager.

Under the plan of organization the United States is divided into three zones. Each of these zones covers certain jobbing centers, the Pacific Coast territory embracing the states of California, Oregon and Washington, most of Arizona, the western half of Nevada, the section of Idaho tributary to Spokane, the Hawaiian Islands and Alaska, and being under the direction of R. M. Alvord, Pacific Coast merchandise manager, with offices in San Francisco. Necessary contact salesmen and specialists are maintained at strategic points to assist jobbers in their respective territories. The jobbing centers of Salt Lake City, Denver, and Butte are in the central district, which is under the direction of W. H. Colman with offices in Chicago. Among the items coming under the direct supervision of this division of the company are: code wire and cords, wiring devices, conduit and conduit fittings, fans, Tungar battery chargers, insulating materials and tapes, bell-ringing and toy transformers, and welding electrodes.

Permanent Cooking School for Range Prospects

Weekly Instruction Is Used by Portland Central Station to Convince Prospects of Value of Electric Range

So much interest was shown in the electrical cooking school conducted under the auspices of the Oregonian in Portland that a permanent school has been established by the Portland Electric Power Company as part of its regular range activities.

An electric kitchen has been set up in the salesrooms of the company with complete electrical equipment. This is so arranged that it can be dismantled during the week and the space filled with a display of electric ranges. When it is needed for the cooking class, a portable dais is moved into one end of the room, the range set up, other kitchen equipment added, and the remainder of the room filled with chairs. This outfit has been standardized so that when needed it can be transported to fairs and exhibits of various sorts at a moment's notice.

The women invited to attend this class are made up of actual prospects, those recently sold ranges and others who have come of their own accord through advertisements seen in the newspaper or through the notice posted at the entrance to the building. The great advantage is in the opportunity given to convert prospects to the method of electrical cooking.

Salesmen either call, telephone or write prospects concerning the chance of attending this private school, which is conducted Thursday mornings in the company's rooms. A large proportion of those thus reached take advantage of the opportunity. In adddition, all those who have purchased ranges within the past thirty days are invited. This not only helps to make them satisfied with their purchase by insuring that they thoroughly understand its use, but the sprinkling of actual users of electric cooking among the audience has a good psychological effect. Women on such occasions are apt to speak in a friendly way with their neighbors, and the natural subject of conversation is the use of the electric range. The new purchaser has been sold thoroughly on the subject of electric cooking or she would not have made the purchase, and is probably enthusiastic about her new equipment. The effect of her unbiased enthusiasm upon a prospect who has not yet made up her mind is often the decisive factor in a sale.

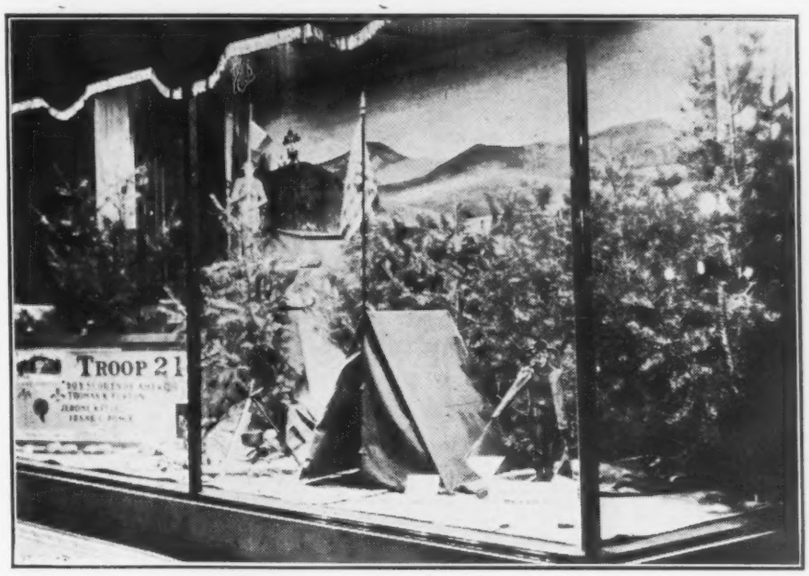
At the conclusion of the talk the names of those present are secured by asking them to leave their addresses in order that an electrical cook book may be sent them. No attempt is made to sell them electrical equipment at this time, although a salesman is always present in order to answer questions and take names of those particularly interested.

This cooking class has shown its value by the number of people who have been attracted by it, as many as 130 women attending some of the sessions. So successful has it been that the same principle has been extended to fairs and shows of all sorts where such a demonstration is possible. Classes were held in connection with the Home Beautiful Exhibit, for instance, and again in connection with the Horse Fair. These were well attended and attracted much interest, undoubtedly bringing many to the regular classes later in the company's rooms.

Baker-Joslyn Company of San Francisco and Los Angeles has sold its Seattle and Portland branches to the Jobbers Supply Company of St. Paul. The sale is the result of negotiations that have been going on for approximately two years.

The Johns-Pratt Company, Hartford, Conn., has issued catalog No. 55 containing a full listing of Noark meter service and main entrance switches, fuses, cutouts, service and fuse boxes.

The Normal Electric Company has been established recently by F. L. Byrum at 3690 Adams Street, San Diego.



The window display of The Electric Shop, the Boise local office and division headquarters of the Idaho Power Company, was presented in connection with the fifteenth anniversary of the Boy Scouts of America. The arms of the cardboard scout were connected to a series of magnets permitting him to signal "Be Prepared." Although only Boy Scouts or those versed in wig-wag signals could read the message, the display attracted much attention. S. J. Gray, salesman in the Electric Shop, decorated the window, which showed the company's interest in the welfare of the community.

NEWS OF THE INDUSTRY

Edison Company to Start Work on Shaver Lake Project

Work on the Shaver Lake tunnel and conduit line, which will connect Huntington Lake, the great storage reservoir of the Southern California Edison Company in the high Sierra, with Shaver Lake, will be commenced early this winter. Starting of the actual work on the Shaver Lake project begins another important era in the Southern California Edison Company's Big Creek-San Joaquin River project, and an expenditure of about $37,000,000 on hydroelectric development during the years intervening between the present and 1930 is contemplated.

This combination tunnel and conduit will tap Huntington Lake at the upper end of the second dam and will have a total length of about five and a third miles. The tunnel proportions will be 12 ft. in diameter with a capacity of 1,250 sec.ft. Where the route crosses Big Creek and Pitman Creek 9½-ft. steel pipe is to be used.

At Shaver Lake, an artificial reservoir with a capacity of but 6,000 acre-ft. of water, it is intended to construct a dam which will impound 139,000 acre-ft. of water and add approximately 180,000 hp. to the present generating capacity of the Big Creek-San Joaquin project. This dam will be below the present lake, and will be approximately 220 ft. thick at the base with a height of approximately 190 ft.

With the completion of the Huntington-Shaver Lake tunnel the Southern California Edison Company will have completed more than thirty miles of tunnel since it resumed active construction operations following the war.

The total expenditure for water-power construction, reservoirs, power houses, transmission lines to local centers, with the completion of the project which has just been authorized, will bring the investment of the Southern California Edison Company in its hydro program at Big Creek up to $123,000,000.

Puget Sound Power Company Files New Rate Schedules

New tariff schedules providing for a general reduction of residential and commercial electric lighting rates throughout all cities and other territory served by the Puget Sound Power & Light Company, Seattle, were filed with the state department of public works at Olympia July 30 by H. J. Gille, general sales manager for the company. The new rates become effective Sept. 1.

Under the new schedules filed by the company, the present practice of allowing consumers a discount of 10 per cent for payment of bills before the 10th of the month in which they are received is discontinued.

In some of the cities and districts which the company serves where the rates at present are comparatively low the slight reduction in rates effected under the new tariff is practically offset by elimination of the discount. This is true in such places as Everett in Snohomish County; Bellingham, Whatcom County, and Mount Vernon, Skagit County.

In a majority of instances the top block shows a downward trend of at least ½ cent, with rates ranging from 7½ cents for the first 60 kw-hr. to 11 cents for the first 60 kw-hr. In practically all districts affected by the new tariffs the rate remains at 3 cents per kw-hr. for consumption beyond the primary block. In practically every instance the present minimum rates are retained. In most cases the minimum rate is $1 a month.

The new tariff schedules do not affect either Seattle or Tacoma, both of which are served by their own municipal lighting systems.

The Puget Sound Power & Light Company, according to Mr. Gille, now has a network of lines extending south from the British Columbia boundary to Woodland, in Cowlitz County. The company also has a line along the Chicago, Milwaukee & St. Paul Railway Company's line over the Cascade Mountains extending as far east as Chelan Falls.

Rehearing in Aberdeen-Wynooche River Rights Matter

Rehearing in the matter of the proposed cancellation of the water power rights of the city of Aberdeen, Wash., on the Wynooche River recently was held before R. K. Tiffany, state supervisor of hydraulics at Olympia, Wash. E. E. Bonner, city attorney, presented evidence of the progress being made by the city to maintain its rights, which it gained under a permit transferred to the city by J. E. Malinowski. The hearing followed a notice sent by former Supervisor Marvin Chase ordering the city to appear and show cause why its permit should not be canceled for failure to proceed with development as required by the permit. (Journal of Electricity, April 15, 1925, p. 297.) The city then applied for extension of its permit and the supervisor of hydraulics took the new evidence under consideration.

Active opposition to the city's development of the Wynooche comes from the Grays Harbor Railway & Light Company, which is seeking to appropriate all available water on the Wynooche for hydroelectric power purposes. The company has filed with the state department its agreement in case it acquired the power rights to permit the city to take such water as necessary for an increase to its present municipal water supply.

To Test Effect of Water Hammer on Welded Steel Penstocks

Exhaustive tests to determine the effect of water hammer upon welded steel penstock pipe are to be conducted early in September at the Milwaukee works of the O. A. Smith Corporation. The exact date of the tests will be announced later.

The tests will be made on an 8-ft. section of 50½-in. o.d. steel pipe 2 in. thick. The pipe will be welded from four longitudinal sections. Four-inch cast steel heads will be welded to the pipe section and the vessel submitted to a hydrostatic pressure of 1,000 lb. per sq. in. By means of a pump this pressure will be raised to 2,000 lb. per sq. in and released to its original pressure at the rate of 120 times per minute. Thus an effect similar to water hammer will be set up.

Following the tests the pipe will be cut up and examination made to determine the effect of the pressure changes upon the structure of the steel. Specimens will be compared with a section cut from the pipe prior to the tests.

Engineers connected with western power companies which are contemplating high-head developments in the near future will witness the tests. Among the companies which are planning to be represented are the Southern California Edison Company, San Joaquin Light & Power Corporation, Pacific Gas and Electric Company, Feather River Power Company and the City of San Francisco. Further details regarding the tests can be secured from B. F. Bart, Pacific Coast district sales manager, A. O. Smith Corporation, 1108 Commercial Exchange Building, Los Angeles.

Present Rate of Progress on Cushman Project Expected to Make Power Available Jan. 1, 1926.—The Cushman power project of the City of Tacoma is progressing at a pace that will make power available by Jan. 1, 1926, according to the opinion of Ira S. Davisson, commissioner of light. This was the original date set for the turning of the wheels. The big dam in the Skokomish River, which is being poured in three sections across the river, is more than 120 ft. above bedrock on the lower side and more than 150 ft. on the higher, Mr. Davisson reports. The power line construction has proceeded to the point of stringing wires.

South Pasadena Street to Have Ornamental Street Lights.—The board of trustees of the City of South Pasadena, Calif., has passed a resolution declaring its intention to cause ornamental street lights to be installed on Milan Avenue from Monterey Road to Huntington Drive. Thirty-four single light standards using 250-cp. nitrogen-filled lamps are specified.

Nine-Mile plant recently purchased by The Washington Water Power Company

Washington Water Power Co. Acquires Nine-Mile Plant

The Washington Water Power Company, Spokane, recently has acquired by purchase from the Spokane & Eastern Railway & Power Company the Nine-Mile hydroelectric power plant located below Spokane on the Spokane River. Announcements of the sale were made by M. W. Birkett, general manager of The Washington Water Power Company, and W. G. Paine, vice-president and general manager of the Spokane & Eastern-Inland Railways, in Spokane, and also in Chicago by M. H. MacLean, president of the Spokane & Eastern-Inland properties.

The Nine-Mile plant, which has an installed generating capacity of 20,000 hp., consisting of four 5,000-hp. units, supplies power for the operation of the Spokane & Eastern-Inland electric trains and also furnishes a considerable amount for commercial use. According to present plans, contracts will be entered into between the power company and electric railway company whereby the former will supply power for the operation of the latter for a number of years. The present commercial business also will be retained so that the acquisition of the plant will not give the power company any additional surplus power. However, its addition to the system will bring the installed generating capacity of The Washington Water Power Company up to approximately 185,000 hp. The company now owns six plants on the Spokane River, including the Nine-Mile plant, and one on the Similkameen River near Oroville.

The disposal of the Nine-Mile power plant is in accordance with the policy of the bondholders' protective committee which acquired through foreclosure sale in 1919 the properties of the old Spokane & Inland Empire Railroad Company which had gone into the hands of a receiver through default in the payment of bond interest. The committee has been operating the properties with a view toward the ultimate payment of all claims. It is the duty of the committee to liquidate the business as soon as possible, the first step in this direction having been the sale of the street railway lines in Spokane to the Spokane United Railways. The disposition of the Nine-Mile plant leaves the bondholders' committee in possession of certain other properties, consisting chiefly of electric railroad lines, which it is willing to sell to any railroad which can use them advantageously and pay a fair price for them, according to Mr. MacLean. In the meantime it will continue to operate them to the best of its ability.

Byllesby Company Effects House Organ Standardization

Standardization of member companies' employee publications recently was effected by the Byllesby Engineering & Management Corporation to conform with the home office external publication, the Byllesby Monthly News. Upon the Pacific Coast the plan affects the house organs of the Western States Gas & Electric Company, Stockton, Calif., and the San Diego Consolidated Gas & Electric Company.

Conforming with the spirit of the change of policy in regard to the employee magazines, the house organ "Glow," of the San Diego Consolidated Gas & Electric Company, has been changed to "The News-Meter," beginning with its July issue. The reason given for the change in name is that the standardized form of publication belongs more to a newspaper type of publication than did "Glow", which adhered to magazine type, and a new name appropriate to its changed character has been thought advisable by the the staff and management.

No change in the title of "Fumes and Flashes", the employees' magazine of the Western States Gas & Electric Company, is contemplated.

L. A. Bureau of Power and Light to Build Substations

Announcement has been made by the Bureau of Power and Light of Los Angeles of a program to spend $21,000,000 for extensions and betterments to its distribution system. Work is to begin immediately on twelve new substations to cost approximately $2,500,000 which will have an initial installed capacity aggregating 75,000 kva. and transforming power from 33,000 to 4,400 volts. These stations will be located at important distributing centers and will have the most modern type of electrical apparatus for the relaying of energy to surrounding consumers and will make light and power service available in much larger quantities in the districts affected.

Seven of the new stations will be constructed of steel frame, finished with stucco and having concrete roofs. Four will be constructed of reinforced concrete, and all will be of the class of construction standardized by the distribution department.

Four buildings to be used as offices for foremen are to be constructed. One of these, which is to be headquarters office for all foremen, will be a two-story reinforced concrete structure occupying a space 40 x 300 ft.

During the coming year four miles of 33-kv. underground cable will be laid as well as four miles of low-voltage cable. Also fifty miles of 33-kv. overhead lines will be built, all of which will require the purchase of large quantities of line equipment.

Report Recommends Disposition of Logan Municipal Plant

Recommendation that the city of Logan, Utah, dispose of its municipal electric light plant and that steps be taken at once to submit to the people a proposition for disposition of the plant has been made by the special electric light plant committee of the Logan Chamber of Commerce to the Chamber's board of directors.

The report, submitted after several months of investigation, states that the conditions under which the plant is operating are "decidedly uneconomic," and adds: "In order to continue under such conditions the tax levy from year to year will be an excessive burden on the people, and will inflict penalties upon taxpayers that will, in all probability, fail to stand the test of law should the matter be submitted to the courts." Large sums will be needed to keep the plant in repair, according to the report, and it is not believed feasible to increase the capacity of the plant or to eliminate the competition now offered by the Utah Power & Light Company. The conclusion of the committee is to the effect that it will be cheaper for residents to purchase power from private companies rather than to continue as at present with the flat rate or to go on meters.

Smithsonian Institution Publishes Report.—The annual report of the board of regents of The Smithsonian Institution recently has been published. It shows the operations, expenditures, and condition of the institution for the year ending June 30, 1923. It contains much interesting information and is illustrated with numerous drawings, plates and charts.

Data on Operation of Twelve Largest California Electric Utilities

Figures on the operation of California electric utilities compiled by Lester S. Ready, chief engineer of the California State Railroad Commission, at the request of Paul S. Clapp, assistant to Herbert S. Hoover, show that the approximate rate base of the twelve largest utilities for 1924 was $441,358,000. In 1923 this rate base was $369,455.000, and in 1922, $328,095,000. The twelve companies included in this total represent approximately 97 per cent of the total electric utility business of the state. It is estimated that the increase in the rate base for 1925 will be approximately $90,000,000, bringing the total at the end of that year up to $535,000,000.

In the accompanying table, which was compiled from data supplied to Mr. Clapp and from the annual reports of the various utilities, some interesting statistics on the operations of the electric utilities are divulged. Data on the rate base, gross revenue and taxes are taken from the report to Mr. Clapp. The other figures are taken from the annual reports of the utilities.

Earnings Basis—California Electric Utilities, Twelve Largest Companies

	1922	1923	1924
Gross revenue (electric operations)	$ 66,203,598	$ 72,060,576	$ 80,115,257
Expenses:			
Operating expenses	25,920,005	27,816,875	35,929,747
Taxes	6,386,563	7,091,794	6,954,131
Uncollectible bills	198,500	216,100	240,300
Depreciation annuity	4,530,000	5,180,000	6,080,000
Total deductions	$ 37,035,068	$ 40,304,769	$ 49,204,178
Net for return (available for interest, sinking funds, dividends and surplus)	29,168,530	31,755,807	30,911,079
Approximate rate base (estimated by Chief Engineer of Commission from Commission decisions)	328,095,000	369,455,000	441,358,000
Per cent of return on approximate rate base (reasonable cost of operative properties)	8.89%	8.61%	7.01%

Colorado River Placer Claimants Sued in Nevada by U. S.

Complaint was filed July 28 in the office of the clerk of the United States court for the Nevada district by George Springmeyer, United States attorney, against twenty-three individuals and an injunction asked to prevent them from further claiming or occupying sixty asserted placer mining claims and three asserted load claims that lie along the Colorado River in Clark County, Nevada, according to recent press dispatches. These claims extend for about twenty-five miles, taking in the Upper Black Canyon, Callville and Boulder Canyon storage and power dam sites and the reservoirs above each.

The government contends that, in general, the lands in question were not subject to entry, having been withdrawn; that, prior to the date of final effective withdrawal, the defendants made no discovery of valuable deposits on the claims in "quantity or grade sufficient to induce any reasonable person to prosecute further work"; and that the defendants sought possession of "the said pretended groups of mining claims under the guise and pretext that they were bonafide mineral locations, for the purpose of utilizing the water and power resources of said Colorado River and the storage reservoirs and power dam sites adjacent thereto and on the adjoining lands..."

The suit is said to be similar to one already filed in Arizona covering fifty five claims recorded in that state.

Application Filed for Permit to Build 11,000-Volt Transmission Line.—H. G. Kumle and Charles R. Rosebaum of LeGrange, Calif., have applied to the Federal Power Commission for a license to cover a transmission line, a portion of which is in the Tahoe National Forest. It is proposed to build the transmission line from the Bullards Bar power plant of the Yuba Power Company, a distance of 3.86 miles, to the mining property of the applicants. The line is to carry 11,000 volts.

New Hydro Plant Put on Line by West Kootenay Company

Bringing the capacity of the Bonnington Falls installations of the West Kootenay Power & Light Company to a total of 72,000 hp., the Lower Bonnington Falls plant of the company was put on the lines Aug. 3. Two 20,000-hp. hydro units geared directly to two Canadian General Electric Company generators are installed in the new plant. Provisions for a third unit of similar capacity are made in the plant and will be added when the power is needed.

The opening ceremonies were attended by about five hundred guests consisting of business and civic leaders from the districts served by the company. Following the starting of the new plant by T. H. Pattullo, minister of lands for British Columbia, the guests were entertained at a banquet and dance.

The West Kootenay company serves a number of communities in the vicinity of Trail, B. C., and Northport, Wash. Power also is supplied to the smelter of the Consolidated Mining & Smelter Company of Canada at Trail and the mine and mill of the Allenby Copper Corporation near Princeton.

Reduction in Power Rates Sought by Oakland, Calif.

The city council of Oakland, Calif., on Aug. 5 instructed the city attorney to institute proceedings before the California State Railroad Commission for the purpose of securing a reduction in the power rates charged by the Pacific Gas and Electric Company and the Great Western Power Company.

Figures presented by the city attorney were claimed to show that the business of the companies in the East Bay district had increased 46 per cent since 1922, that the number of consumers had grown from 84,000 to 104,000, and that the percentage of increase in operating expenses has been low.

Series of Inspirational Meetings Held by Appliance Company

To bring about a better understanding of the merits of the Hotpoint line of ranges, water heaters and cookers among central station salesmen, the Edison Electric Appliance Company, Inc., through P. H. Booth, district manager, is conducting a series of inspirational meetings throughout the northern section of California. The first of these meetings, held before a number of officers, department heads and salesmen of the Great Western Power Company and the Pacific Coast jobbers for the Edison company, the Pacific States Electric Company, was conducted at the Palace Hotel, San Francisco, on Aug. 10.

Mr. Booth presided at the meeting and introduced as the first speaker Miss Galvin, home economist, who spoke instructively on the range from the woman's standpoint and brought out such items of sales resistance usually encountered by the salesman in dealing with the housewife. She was followed by J. C. Douglas, manager of the San Francisco district, who discussed the features of the water heater, the cooker, and the economic characteristics of the Hotpoint electric range. Mr. Booth then introduced R. W. Turnbull, who is in charge of the Edison company interests in the Northwest. Mr. Turnbull's address was easily the feature of the evening. For an hour he held the concentrated attention of the audience in presenting the story of the development of the Hotpoint range, a discussion of its structural features, and its selling points.

D. E. Harris, vice-president of the Pacific States Electric Company, spoke briefly of the desire on the part of his company to lend its hearty cooperation toward increasing range sales and said that instructions to his salesmen had been issued to this effect. R. E. Tompkins, range specialist for the same company, seconded Mr. Harris' statement. Mr. Booth then presented some of his company's sales literature, prepared for the aid and guidance of the salesman, including a bound portfolio of photographs showing Hotpoint products. George Cole, heavy-duty range salesman, then spoke of the differenece in sales methods required for hotel and restaurant sales. The evening's entertainment closed with brief addresses from Messrs. Woodward, Sharon, Wrenn and Sanford, all of the Great Western Power Company.

Fire Results in Damage Suits Against Power Company.—Suits asking damages totaling $902,592 have been filed against the Great Western Power Company of California by the California Wharf & Warehouse Company and Balfour-Guthrie Company as the result of losses incurred Sept. 13, 1924, when a fire destroyed the warehouse company's storage plant at Port Costa, Calif., and more than 9,000 tons of grain belonging to Balfour-Guthrie Company and others. Charges are made that the fire was started by transformers in the transformer room of the warehouse, that the transformers were in poor condition, and that carelessness caused them to catch fire. The power company, after investigation, denies any responsibility as to the damage having been caused by the transformers.

Large Power Project Planned for Cowlitz River, Washington

Indicating unusual activity in proposed power development on the Cowlitz River in Lewis County, Wash., four applications to appropriate water and two applications to construct reservoirs, all for hydroelectric purposes, have been recently filed with R. K.Tiffany, state supervisor of hydraulics.

The two applications to construct reservoirs and three of the applications to appropriate water were filed by H. W. Crozier, who gave his address as being in care of the Cowlitz, Chehalis & Cascade Railway, Savings and Loan Building, Chehalis. The applications are for units of a $1,500,000 power project, he said. The three water applications are identical in nature and cover three units of a great plan for the development of the Cowiltz River, according to Mr. Crozier, these units to be known, respectively, as Mayfield, Mossy Rock and Big Bend.

Each application covers the appropriation of 1,650 sec.ft. of water from the Cowlitz River for the development of electricity for lighting, cooking and other domestic purposes and for the development of power. Construction involved includes a pipe line two miles long. The diversion dams are to be of the arched cyclopean concrete form of overfall type, with steel headgates. The dams are to develop 16,110 hp. The total fall to be utilized is 130 ft. gross, 123 ft. net. The dams are to be 135 ft. high, 200 ft. long on top and 50 ft. long on the bottom. Power is to be developed by a dam 135 ft. high, 105 ft. over water level, according to Crozier, who adds that 11,000 ft. of 13-ft. 6-in. wood stave pipe are to utilized in the construction program. A concrete power house with a 17,000-kw. capacity is to be built.

The three plants are to have a total capacity of 54,000 kw. The storage capacity of the two lower plants of the project, Mayfield and Mossy Rock, will be utilized, Crozier explained, to augment the lack of storage in the Big Bend unit and thereby permit conservation of the maximum power which may be realized between the intake of the Mossy Rock unit just below the confluence of the Cispus River and the discharge of the Mayfield unit at the end of Mayfield Canyon.

Both reservoir applications are for the storage of 25,000 acre-ft. of water to be taken from the Cowlitz River. An overfall waterway over the dam, supplemented by additional spillways for each side of the dam, is to be utilized. The areas to be submerged when the reservoirs are full is 640 acres. The reservoirs are to have a maximum depth of 120 ft., with an approximate mean depth of 70 ft.

Construction of the reservoirs is to begin about one year after the completion of the power plants proper and will be finished within eighteen months after it begins, according to the applications.

The sixth application, which is for an unspecified amount of water from the Cowlitz River for hydroelectric purposes, was filed by J. G. Kelley, 7 East 16th Street North, Portland. The project proposes to develop 54,545 hp., according to the application. Construction costs are not given. The diversion dam is to be 80 ft. high and power is to be developed at a fall of 80 ft. A masonry dam and power house are to be built. Mr. Kelley requested that the application be held in abeyance for a reasonable length of time to permit him to make necessary surveys and maps for completing his application. Additional construction details are not given.

Two Street-Lighting Contracts Signed in San Diego

Contracts for two new ornamental lighting districts in downtown San Diego, Calif., were awarded recently and work is progressing on the installation of the units, adding to the area recently lighted by new systems and replacing old equipment with newer and more efficient equipment in another instance.

Martin & Walker were awarded the contract to replace the old-fashioned lighting standards that for years have illuminated Sixth Street, between B and F Streets. The district now will be lighted by 64 new lamps of 600 candle-power each set on metal standards. Two lamps will be mounted on each post.

The second district to be contracted for is a new district, providing for 160 single standards of metal on Eighth, Ninth, Tenth, Eleventh and Twelfth Streets from Broadway to Market Streets. Each standard will be mounted with a 600 candle-power lamp, and, as in the other district, the glassware will be of ripple glass with dome reflectors. The Globe Electric Company of San Diego was awarded the contract for this work.

Impressed by the complete illumination provided in the recent installations east of Sixth Street, the districts west of this street at present are contemplating similar installations. Suburban districts both within the city limits and in the back country about San Diego likewise are planning extensive street-lighting activity.

Work on Test Arch Dam to Be Begun in October

Work is expected to begin in October on the test dam to be erected by a research committee of Engineering Foundation for the purpose of investigating questions of strength of arch dams, according to a statement made by the Foundation. Work on the foundation of the dam already has been begun.

The dam, which is situated on Stevenson Creek, a tributary of the San Joaquin River, about 60 miles east of Fresno, Calif., will be built first to a height of 60 ft. above the bottom of the foundation. Later, after preliminary tests have been made, it will be increased to a total height of 100 ft. The upstream radius of curvature will be 100 ft. and the thickness 2 ft. from the 30-ft. level to the top, while the lower part will splay out to a base thickness of 7 ft. 5 in.

B. C. Company Completes Fifth Unit of Stave Falls Plant

The fifth unit of the Stave Falls plant of the British Columbia Electric Railway Company, Ltd., Vancouver, B. C., has been completed. The addition of this 25,000-hp. unit completes the enlargement of the Stave Falls plant, which now has a total capacity of 75,000 hp.

The plant, originally built by the Western Power Company, consisted of three units with a capacity of 39,000 hp. when it was taken over by the British Columbia Electric Railway Company at the end of 1920. The latter installed a fourth unit bringing the plant's capacity up to 52,000 hp., and almost immediately took steps to increase its capacity still further by planning a fifth unit, now just completed. The total cost of the enlargement of the Stave Falls plant is estimated at $2,500,000.

Members of the advisory board of the Electrical Cooperative League of Denver and visitors at a recent meeting of the organization. Top row, left to right—C. W. Kaylor, Westinghouse Electric & Manufacturing Company; E. C. Headrick, electragist; A. E. Bacon, Mine & Smelter Supply Company; R. G. Gentry, Public Service Company; W. R. Kaffer, Electric Supply & Construction Company; J. C. Davidson, Hendrie & Bolthoff Manufacturing & Supply Company; Clarence Keeler, Public Service Company; and L. B. Johnson, General Electric Company, Salt Lake City. Middle row—F. L. Easton, Economy Fuse Company; Dean D. Clark, League treasurer, Mountain States Telephone & Telegraph Company; A. C. Cornell, League chairman, Western Electric Company; Thomas W. Nixon, Denver Electrical Contractors Association; E. A. Scott, League secretary, Scott Bros. Electric Company; W. A. J. Guscott, League vice-chairman (contractors), electragist; F. F. McCammon, League vice-chairman (utilities), Public Service Company. Bottom row—George Bakewell, Jr., field representative; O. L. Mackell, Public Service Company; Ernest P. Kipp, League vice-chairman (manufacturers), Hazard Manufacturing Company; John J. Cooper, Mountain Electric Company; B. C. Watts, B. C. Watts & Company; and S. W. Bishop, executive manager of the League.

Portland Embarks on Ornamental Street-Lighting Plan

On a bid of $118,876.69 the Portland Electric Power Company was awarded the contract for ornamental post lighting of the newly created lighting district embracing seventeen blocks on Broadway between Hoyt and Jefferson Streets, in Portland. The figure, which was approximately $2,000 less than the competitive bid of the Northwestern Electric Company, covers labor and material of installation, and operation and maintenance for five years. The lighting district, which includes one of the principal retail business and theater streets of the city, was established under a recent amendment to the city charter permitting the formation of such improvement districts by petition of fifty per cent of the property owners,

New type of street lighting unit being installed in Portland

and the assessing of the cost against the abutting property on a five-year bonding basis.

The unit determined upon by the city council, acquiescing in the demand of a majority of the property owners involved, was a Union Metal, pressed steel standard, with two General Electric Company Novalux units with medium alabaster rippled globe and canopy. Each unit will contain a 20-amp. Mazda high-efficiency series street-lighting lamp of 15,000 lumens rating, and the standards will be set six to a block, three on each side of the street, making a total of 106. This equipment thus arranged will give an average intensity on the pavement of 2.85 foot-candles, and 665 lumens per linear foot of street. On the basis of lumens per linear foot, this street will be the fourth best-lighted street in the United States, the three better being Main Street, Salt Lake City, with 822 lumens; Market Street, San Francisco, with 750 lumens; and Erie Boulevard, Schenectady, with 700 lumens.

The plans of the power company for serving this equipment call for the installation of six series-circuits of parkway cable, each supplied from a 40-kw., 6.6-amp., subway-type, constant-current transformer. In the base of each post will be a 6.6 to 20-amp. series, ornamental-post transformer, double-wound for two secondary circuits.

It is understood that the equipment specified for this lighting district will be made standard for the downtown street lighting of the city, with the same type of architectural design in single units and smaller sizes for the secondary business streets and residence districts. Other lighting districts in the process of formation are Washington, Morrison, Sixth and Fifth Streets.

Pulley Manufacturer Appoints San Francisco Agent

In connection with its program of providing adequate distribution of its products and full service for motor manufacturers, distributors and dealers, the Rockwood Manufacturing Company, Indianapolis, Ind., has announced the establishment of a Rockwood Paper Pulley Store in San Francisco with the Buzzell Electric Works, 532 Sansome Street, as agents.

The plan of establishing distributing points throughout the country was evolved in order to meet the demands of the motor trade for adequate servicing facilities for pulleys. Price standization was another factor.

Rockwood Paper Pulley Stores, Inc., the distributing agency for the Rockwood Manufacturing Company, now has branches in Denver, Salt Lake City, Los Angeles, Seattle and San Francisco. In Denver Hendrie & Bolthoff are the agents; in Salt Lake the Capitol Electric Company; in Los Angeles the Illinois Electric Company; and in Seattle, the Seattle Hardware Company.

The San Francisco branch was established by William D. Hamerstadt, general manager of the Rockwood Manufacturing Company, who came to the Coast for that purpose.

Small Power Development Contemplated on Salt River in Arizona.—Charles A. Johnson, of Lakeside, Ariz., has applied for a preliminary permit covering a small power development in Salt River twenty miles north of Globe. He proposes to erect a concrete diversion dam 15 ft. high near Hess Creek. Five hundred sec.ft. of water is to be diverted through a 7-mile tunnel and one-fourth mile of steel pressure pipe to a power house. The power is intended for use in the Globe and Miami mining districts.

Wilbur, Wash., Claims Record in Range Saturation.—A record in electric range saturation for a town of about 1,000 population is claimed for Wilbur, Wash., by John Barnes, district agent for The Washington Water Power Company, which serves the town. With 125 ranges placed among the 230 residential customers of the company a saturation of 54 per cent has been reached. Other smaller communities on the system of The Washington Water Power Company have a higher percentage, but it is believed that Wilbur's total is a record for towns in its class.

Annual Stockholders' Report Issued by Westinghouse

The annual report of the Westinghouse Electric & Manufacturing Company and its proprietary companies for the fiscal year ended March 31, 1925, recently was made public. It shows gross earnings from sales billed of $157,880,291.87. Cost of sales, including factory cost, which covers all expenditures for patterns, dies and new small tools and sundry other betterments and extensions; also depreciation of property and plant, inventory adjustments and depreciation; all selling, administration, general and development expenses; and taxes, is given as $144,242,065.10, leaving a net manufacturing profit of $13,638,226.77. Gross income from all sources amounted to $17,841,406.19, and net income to $15,324,364.36. These amounts for the year 1924, in the order named, were: $154,412,918, $147,006,280, $17,406,638, $18,743,076, and $16,125,303. The decrease in net income for 1925 as compared with 1924 amounted to $800,939.

The report states that the decrease in the total value of all orders booked was 5 per cent as compared with the previous year. Orders for incandescent lamps and radio apparatus substantially exceeded last year. The value of unfilled orders at the close of the fiscal year was $55,271,908 as compared with $63,738,702 of the year previous.

With the ultimate view of retaining at East Pittsburgh mainly the manufacture of heavy machinery such as electric locomotives, large generators and motors, and similar equipment, a number of important additions to and rearrangements of its manufacturing facilities were made. The expense of these rearrangements and changes has been included in the operating costs for the year. Also included in these costs is the expense of the redesigning of certain important lines of product, notably steam turbine and large circuit breakers.

The report reviews the company's social and financial welfare work carried on in the interest of its employees. This includes a group insurance plan, under which approximately 35,000 emuloyees now are insured for $500 each, and approximately 19,000 of whom have have additional insurance in varying amounts, the total group insurance now carried amounting to $32,160,000. Other branches of the welfare work covers housing operations, by which the company has erected on land adjacent to its different works 451 houses and sold them at cost to employees on terms of 10 per cent down and one per cent a month; educational facilities, scholarships, and a pension system.

Priest Rapids Power Market to Be Assured Before Work Starts.—Work on the proposed Priest Rapids hydroelectric power project on the Columbia River in Washington will not be started until a market for the power is assured, according to a recent statement made in Seattle by S. Z. Mitchell, president of the Electric Bond & Share Company of New York. His company through its various holdings is interested in the Washington Irrigation & Development Company, which holds the permit for the Priest Rapids development. Mr. Mitchell stated that Henry J. Pierce of Seattle is now in Germany investigating methods of creating a sufficient demand for the power to be generated.

New Hydroelectric Unit to Be Built at Mormon Flat Dam

Money to be used in the construction of the first of two 10,000-hp. hydroelectric units at the Mormon Flat Dam on Salt River will be advanced to the Salt River Valley Water Users Association by the Central Arizona Light & Power Company of Phoenix. Under the contract the loan of $410,000 is to carry an interest rate of 6 per cent and is to be entirely refunded in twenty-five years. It is expected to have the proposed new unit in operation in the spring of 1926.

The output from this new plant is to be sold at 8½ mills per kw-hr. to the Central Arizona Light & Power Company, which contemplates spending approximately $200,000 in the city of Phoenix to handle the distribution of this additional current.

Edison Company Issues Earnings Statement for Six Months

Earnings statement of the Southern California Edison Company for the first six months of the year shows a remarkable improvement in the general prosperity of the company over the same period last year.

After providing for depreciation, earnings for the first six months are, on an annual basis, in excess of $12 per share of common stock outstanding June 30, 1925, as compared with an earning of $3.55 for 1924.

This increase in earnings is ascribed to the fact that practically all of the energy sold this year has been generated by hydroelectric plants, whereas last year the water shortage made necessary the use of a large number of rejuvenated steam plants. With the completion of the 13½-mile Florence Lake tunnel on the Big Creek-San Joaquin project this spring, it is said that all danger from future droughts has been eliminated completely.

Total operating revenue of the company for the past six months was $11,545,881 with operating expenses of $4,048,866. Operating revenue for June totaled $2,167,733 and operating expense was $595,995. Balance for depreciation and surplus for the six months' period amounted to $5,258,058 as compared with $2,391,679 for the corresponding period last year. Balance for depreciation and surplus in June totaled $1,202,045.

Dealers Cooperate with Utility in Iron Sales Drive

An electric iron campaign, utilizing the new Westinghouse automatic iron, is following upon the heels of the recent kitchen-lighting-unit campaign in the San Diego territory. Instead of the power company sending out salesmen, however, this campaign is to be one conducted by the central station on behalf of the dealers.

One hundred per cent cooperation has been given the power company, the San Diego Consolidated Gas & Electric Company, in the stocking and display of this special iron in connection with the campaign. All electrical dealers in San Diego County, Calif., as well as the branch offices of the company, have some of these irons on hand.

An extensive advertising campaign started June 15 in every paper in the county, combined with direct-mail circularizing. The thermostatic feature of the iron, tying in with the advertising slogan in connection with it, is being especially emphasized.

A credit of a dollar for each old iron turned in for the new iron, is also advertised. Emphasis is being placed in the advertising that the new irons may be purchased from any electrical dealer. A list of the dealers and their addresses is also to be displayed prominently.

Perfect dealer cooperation in this drive is attributed to the success of the kitchen-lighting campaign and the results gained from it.

Advertisers Association Appoints Chairmen for Convention

Appointment of chairmen for important committees featured progress made in the last week in the development of plans for the convention of the National Industrial Advertisers Association to be held at the Chalfonte Hotel, Atlantic City, Oct. 19, 20, and 21.

One new appointment was that of J. N. McDonald of the Anaconda Copper Mining Company, New York, incoming president of the Technical Publicity Association, to be chairman of the On-to-Atlantic City Committee. Other chairmen named are D. J. Benoliel of the International Chemical Company, Philadelphia, to head the exhibit committee; Hoyt Catlin of the Bryant Electric Company, Bridgeport, to head the entertainment committee, and H. J. Downes of the American Locomotive Company, New York, to head the transportation committee.

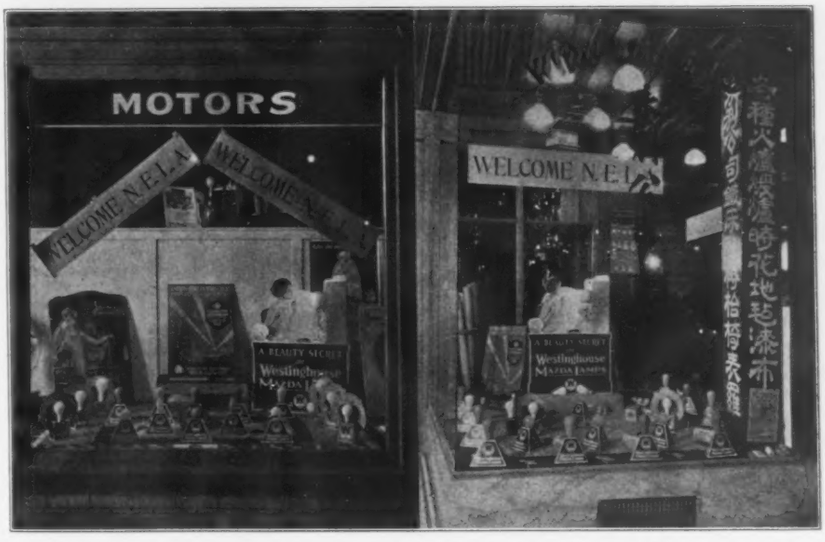
Organization of the general committee has been completed. W. A. Wolff of the Western Electric Company, New York, is chairman. The other members are J. L. Ashcroft, Ludlow-Saylor Wire Company, St. Louis; Joseph C. Bowman, Cleveland; Ezra Clark, Clark Tructractor Company, Buchanan, Mich.; O. C. Dahlman, Koehring Company, Milwaukee; W. S. Hays, National Slate Association, Philadelphia; J. N. McDonald, and A. M. Staehle, Westinghouse Electric & Manufacturing Company, East Pittsburgh.

First Unit of Big Pine Plant of Los Angeles in Operation

The Bureau of Power and Light of Los Angeles placed the first 4,000-hp. unit of its Big Pine power plant in operation July 31, one week ahead of schedule. Work on the installation was speeded up in order to be able to furnish emergency service to a number of mines and industrial plants in the Owens Valley region that were temporarily without power because of damage done to the feeder lines of The Southern Sierras Power Company during a violent electric storm and cloudburst. Power from the Big Pine power plant is to be used in pumping water from approximately 300 wells in Owens Valley into the aqueduct for the water department of the city of Los Angeles.

Jobber Salesmen Hear Details of Power Sales Program of Central Stations.—At a recent meeting of the salesmen of the Pacific States Electric Company the details of the power sales program of the Pacific Gas and Electric Company and the Great Western Power Company was explained in detail. E. F. Perkins, Hugh M. Crawford, F. H. Woodward, and John W. Wrenn spoke for the power companies. P. H. Booth of the Edison Electric Appliance Company also addressed the meeting.

Alameda to Cooperate in Range Sales Program.—Joe Kahn, of the electrical department of the City of Alameda, recently announced that arrangements had been made whereby the city would cooperate with the power companies in the range sales program now being conducted. All ranges will be sold by the electrical contractor-dealers and the furniture dealers, and the installations will be made by the electrical contractors. The installation price will be the same as that quoted by the power companies, and the city will take care of the difference in the same manner as the power companies. However, all installations will have to be made for cash as the city has no means of handling deferred payments.



As a mark of welcome to the N.E.L.A. delegates 96 Westinghouse lamp dealers in San Francisco presented special window displays during the recent convention. Representatives of the Westinghouse Lamp Company assisted in decorating the windows. Two typical displays are shown above.

Service with Company Celebrated by Westinghouse Men

A dinner to celebrate the thirty-second and twenty-eighth anniversaries of service with the Westinghouse Electric & Manufacturing Company was given to H. D. Shute, vice-president in charge of sales and C. E. Heise, manager of the Pacific central division of

H. D. SHUTE

the company, in San Francisco recently. The dinner was given by the Pacific central district sales force, about sixty men being present.

Mr. Shute, who joined the company July 1, 1893, addressed the gathering and announced the appointment of F. A. Merrich as vice-president and general manager of the company. In speaking of the growth of the company during the last thirty years he said:

> We are growing so rapidly that it has become necessary to initiate a policy of decentralization of manufacturing units. Originally East Pittsburgh was our principal manufacturing location. Today we are scattering our plants over the country at advantageous points. We have already spent approximately a million dollars in the San Francisco Bay district establishing assembling and warehousing facilities here. This is a part of the decentralization program. Our selling forces, on the other hand, are being more and more unified in order that a single force may eventually represent Westinghouse before the public.

Mr. Shute also called attention to the need for a new office building at East Pittsburgh. Work on this 11-story building has been started and is to be completed within a year.

C. E. HEISE

Mr. Heise, who celebrated his twenty-eighth anniversary of service with the company, addressed the meeting, telling of some of his recollections of the electrical industry during his association with the Westinghouse company.

Survey for Los Angeles Proposed Water Supply Project

In connection with the proposed project to bring water to Los Angeles from the Colorado River, the Municipal Water Bureau of that city now has six surveying parties in the field, a construction crew building a 40-mile road into the mountains in the vicinity of Shaver's Well, and has opened divisional headquarters in the town of Beaumont, Calif., according to a report recently issued by William Mulholland, chief engineer of the bureau.

Three survey parties are stationed at Beaumont. They are covering the territory between White Water River and the Santa Ana River, the section of the aqueduct route usually referred to as the San Gorgonio tunnel section. A fourth survey party is collecting topographical data in the vicinity of San Bernardino, and two others are working in the San Gabriel Canyon district.

E. A. Bayley, assistant engineer of the Water Bureau, has been placed in charge of all survey work in connection with the project. The road now being constructed will have to be completed, according to Mr. Bayley, before the aqueduct engineers can penetrate into the mountainous country to make certain necessary detailed studies of the region.

Employee Bulletin of Central Station Interesting

The Great Western Power Company of California is publishing a weekly bulletin which is sent to all of its division sales managers, salesmen and employees who are members of the Pacific Coast Electrical Association. The first page of each bulletin contains a letter written by one of the executives of the company concerning a particular phase of activity with which he is most familiar.

In one of the recent issues this letter was written by F. H. Woodward, general sales manager. It contained some pertinent information regarding the range selling campaign which the company is now conducting, including some facts about the cost of operation. It stated that the average family uses from two to three times as much electricity for cooking as it does for lighting; that is, if the lighting bill is $1.50, the cooking bill is approximately $3.00 to $4.50 per month.

A copy of the selling program of the company for the rest of 1925 was enclosed with this bulletin. It covered ranges, water heaters, air heaters, and other information. The regular bulletin contains additional information which is helpful and has been a great aid in building employee morale.

News of the Electragists

Who's hungry? Let's eat!

California Electragists' Convention at Eureka Highly Successful Affair

Papers on business problems of vital concern to contractor-dealers throughout California, the merchandising programs of the Pacific Gas and Electric Company and the Great Western Power Company, discussions of particular problems facing the contractors in various parts of the state, and the election of state and division officers filled the program of the annual convention of the California Electragists held at the Eureka Inn, Eureka, Calif., Aug. 6-8. In the opinion of many of the older members as well as the younger ones this was the best convention that the contractor-dealers in California ever have held.

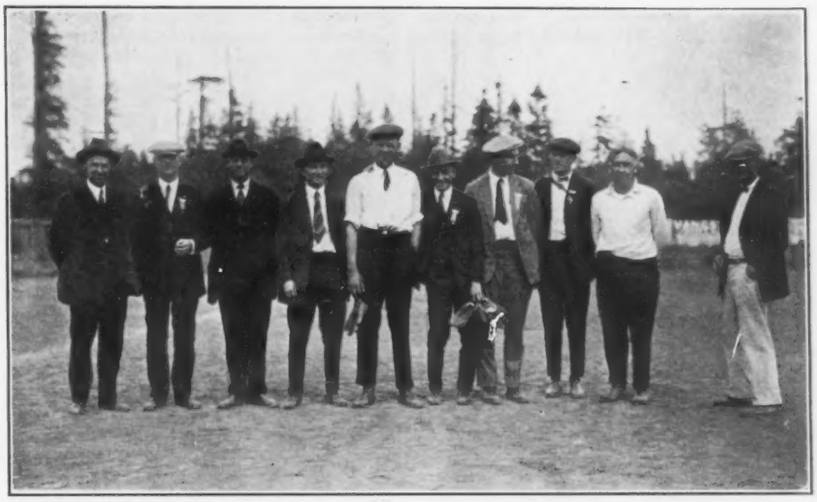
The session of the executive committee was held Thursday morning Aug. 6. The general open meeting was held

Thursday afternoon with Victor Lemoge, in the chair. C. J. Geisbush, executive secretary of the southern division of the California Electragists, discussed the activities of the southern division. He emphasized the importance of members using better methods of estimating and told of the methods used in teaching the Electragists' system of estimating to the members of the southern division. He spoke of the recently organized merchandising section which they are trying out. Mr. Geisbush also outlined some of the future plans of the southern division. George Eldridge, newly appointed field secretary of the northern division, next was introduced by Victor Lemoge.

C. B. Kenney, of San Francisco, reported on the work of the northern division of the association. He explained in detail the operation of the San Francisco association and urged other localities to install similar systems. He stated that the future plans of the California Electragists included quarterly meetings of executive committeemen from all over the state.

E. Earl Browne, manager of the Electrical Contractors and Dealers' Association of San Francisco, discussed the cooperation of the San Francisco association with the city electrical department and the electrical inspectors' association of California. He urged all members to cooperate with the inspectors' association and also to become members of it. Mr. Browne emphasized the importance of the trade distribution policy of Joseph A. Fowler, president of the Association of Electragists, International. Clyde Chamblin, San Francisco, discussed the Red Seal Plan, which will provide a national standard of adequate electric wiring in the home.

George Eldridge, newly appointed field secretary of the northern division of the California Electragists, entered the electrical industry in 1910 as an electrician for the Pacific Fire Extinguisher Company in San Francisco in the building construction department. Mr. Eldridge has had a great deal of practical electrical construction experience. He also has had experience in central station work with the Pacific Gas and Electric Company, Oakland, in the construction department and also in the field accounting department. He was also in the commercial department as a salesman. Prior to accepting his present position, he was in charge of the Frank Electric Company, a contracting company in Hayward, Calif. His practical construction experience together with his sales, accounting and managerial experience, fit him admirably for his new work.



The Humboldt County Electragists, the real entertainers who made the arrangements for the successful convention of the California Electragists.

H. H. Courtright, of Fresno, read an interesting paper, "The Future of the Electrical Industry As I See It." This not only outlined the probable development as seen by Mr. Courtright, but quoted numerous well known authorities to substantiate his predictions. Merchandising programs of the Pacific Gas and Electric Company and the Great Western Power Company proved to be one of the interesting topics at the meeting, for these programs effect every contractor-dealer in the state as well as the members of all other branches of the industry. These plans were discussed by H. M. Crawford, sales manager of the Pacific Gas and Electric Company, and J. W. Wrenn, assistant sales manager of the Great Western Power Company, both of San Francisco.

Active Members Hold Meeting

Active members only were admitted to the meeting held Thursday night. H. H. Walker of Los Angeles was elected president of the California Electragists. He will retain his present position as chairman of the southern division. C. F. Butte, of San Francisco, was elected state vice-president and chairman of the northern division. Edward Martin of San Francisco, was elected secretary of the northern division.

The state executive comitteemen from the northern division are: C. F. Butte, Edward Martin, Victor Lemoge, Clyde L. Chamblin, all of San Francisco, and H. H. Courtright, Fresno. The state executive comitteement from the southern divison are: H. H. Walker and F. E. Elser, both of Los Angeles; Frank McGinley, Wilmington; J. J. Farley, Fullerton, and J. F. Zwiener, San Diego.

Reports were received from various district committeemen at this meeting, and subjects of general interest also were discussed by members. The meeting went on record as favoring the following meetings for all future conventions: executive committee, general open meeting, and a meeting for active members only.

The entertainment provided the delegates was especially interesting. Thursday afternoon the ladies were taken on an automobile tour up the coast as guests of the Arcata Chamber of Commerce. Friday morning the delegates and their wives visited the electric mill of the Dolbeer & Carson Lumber Company.. The plant is operated entirely by electricity, and the Electragists received many valuable pointers after noting the various phases of the mill system. At eleven o'clock the del-

Fred Sundburg, who pitched the Electragists to victory.

egates left in automobiles and buses for the site of the Holmes-Eureka Lumber Company's logging operations near Carlotta. Shortly after noon they sat down to a lumber jacks' dinner served in the camp cookhouse. The afternoon visit to the woods was considered by many of the Electragists as one of the most enjoyable incidents of the convention. This was made from the camp on a logging train to a point where the high-lead logging could be viewed to advantage.

E. B. Team, formerly of the A-C Electric Company of Los Angeles, who recently has become field representative of the Electrical Contractors and Dealers Association of that city. He has had considerable experience as a contractor and was always active in the work of the association.

Saturday Devoted to Sports and Banquet

The ball was held Friday night. Golf enthusiasts of the convention held their Country Club Saturday morning. At noon the delegates were served lunch at Sequoia Park as guests of the Eureka Chamber of Commerce. Shortly afterwards the baseball game between jobbers and manufacturers and the Electragists was held. The Electragists redeemed themselves in a splendid manner after their defeat at Santa Cruz last year by easily winning the game.

The three-day convention was concluded Saturady night with a banquet at the Eureka Inn. Victor Lemoge, retiring president of the California Electragists, thanked the Chamber of Commerce, the merchants, the newspapers,

Oh Eddie!

tournament at the Humboldt Golf and the empolyees of the Hotel Vance and the Eureka Inn and the officials of the plants that were visited for the welcome and general hospitality that had been acorded the delegates. Arthur Dahl, chairman of the golf committee, presented the Manning-Bowman trophy for the ladies to Mrs. C. B. Kenney, and the East Bay Electragists' trophy to L. Siebert. C. B. Kenney, captain of the Electragists' baseball team, gave credit for the winning of the game to the Electragists of Humboldt County.

Dancing was enjoyed during the remainder of the evening.

All aboard for the woods!

The welcome and hospitality of the Electragists and other people of Eureka and Humboldt County were an outstanding feature of the convention and its success was due largely to their efforts.

C. V. Schneider, of the Electrical Supply Company, Sacramento, Calif., recently has sold his retail business to **H. W. Faig** of the Watkins Electric Company, Vallejo. Mr. Schneider and his son Lawrence will continue to engage in electrical contracting with headquarters at 2710 H Street. **Frank Sieke** has charge of the Sacramento store for Mr. Faig.

Marsden Radio & Electric Company, formerly at 265 Sherman Way, Van Nuys, Calif., has moved into a new store at 255 Sherman Way. In his new location Mr. Marsden has doubled his floor space.

Hubbard-Dilworth Electric Company recently opened an establishment at 1667 East Colorado Street, Pasadena, Calif. H. B. Hubbard and H. E. Dilworth are the proprietors.

The Slater Electric Company, Oakland, has moved from 493 42nd Street to 569 19th street in that city.

Book Reviews

PHYSICS IN INDUSTRY VOLUME TWO

Lectures delivered before the Institute of Physics by J. W. MELLOR, D. Sc., Principal of the Central School of Science and Technology, Stoke-on-Trent; A. E. OXLEY, D. Sc., F. Inst. P., Physicist to the British Cotton Industry Research Association; and C. H. DESCH, D. Sc., Ph. D., F. R. S., F. I. C., F. Inst. P., Professor of Metallurgy, Sheffield University. Foreword by The Hon. Sir Chas. A. Parsons, K. C. B., LL. D., F. R. S., President Inst. P. 48 pages, 12 illustrations. $1. Published by Oxford University Press American Branch, New York.

This work comprises three separate lectures, Nos. 4, 5 and 6, and is, of course, the logical follower of volume one.

Lecture No. 4 deals with the applications of physics to the ceramic industries. In this discussion the author omits those applications of physics that are common to the other industries. Many problems of the industry are simplified greatly through the intelligent application of physics and physical phenomena.

The ramifications of physics and the physicist in the textile industry are treated at length in lecture No. 5. All twelve of the illustrations are part of this discussion. Practically everything from raw cotton to finished cloth, including the machines, is touched upon by the author in attempting to show the many opportunities for the physicist in the industry.

The conscious application of physical laws and methods to the practice of metallurgy and the wide scope of research and application necessary at the present day to meet the demands of rapid engineering progress are interestingly dealt with by the author in lecture No. 6.

Meetings

Programs Announced for Seattle A.I.E.E. Convention

Approval by the national papers and meetings committee of the American Institute of Electric Engineers of the subjects for discussion at the Pacific Coast convention of the Institute to be held in Seattle, Sept. 15-20, 1925, (Journal of Electricity, April 15, 1925, p. 305) has been received by the local papers and meetings committee, and the official program for this convention is announced by C. E. Magnusson, dean of the college of engineering, University of Washington, Seattle, chairman of the local committee. The complete technical and entertainment program follows:

Tuesday morning—Sept. 15, 10:30-12:30.

Address of welcome—Dr. Henry Suzzalo, president of the University of Washington.
President's address—Dr. M. I. Pupin, president of the American Institute of Electrical Engineers.
Reports of committees, etc.

Tuesday afternoon—Sept. 15, 2:00 to 5.00 p.m.

Symposium on hydroelectric power development in Pacific Northwest.

(a) "The Baker River Power Development"—W. D. Shannon, Stone & Webster, Inc.
(b) "The Lake Cushman Dam"—B. E. Torpen, City of Tacoma.
(c) "The Oak Grove Development"—H. A. Rands, Portland Electric Power Company.
(d) "Waterpower Development of the Alouette-Stave-Ruskin Group of the British Columbia Electric Railway Company, Ltd."—E. E. Carpenter, British Columbia Electric Railway Company, Ltd.
(e) "Steam Power in Its Relation to the Development of Waterpower"—R. C. Powell, Pacific Gas and Electric Company.

Tuesday evening—Sept. 15, 8:30 p.m.

President's reception, Italian room, Olympic Hotel. Dancing.

Wednesday morning—Sept. 16, 9:30 to 12:00.

Engineering Education and Research

(a) "Some New Features and Improvements on the High-Voltage Wattmeter"—J. S. Carroll, Stanford University.
(b) "A Stationary Type of Laboratory Standard Wattmeter"—H. V. Carpenter, Washington State College.
(c) "On the Nature of Corona Loss"—J. J. Hesselmeyer and J. K. Kostko, Stanford University.
(d) "The Study of Ions and Electrons for Electrical Engineers"—Harris J. Ryan, Stanford University.
(e) "Engineering Research—A Vital Factor in Engineering Education"—C. E. Magnusson, University of Washington.
(f) "Relation Between Engineering Education and Engineering Research"—R. W. Sorensen, California Institute of Technology.

Wednesday afternoon—Sept. 16.

1 p.m.—Several of the beautiful golf courses in the vicinity of Seattle will be available to members and their friends.
Tournament play at the Inglewood Golf and Country Club for the John B. Fisken Cup. This tournament will be open to any member of a Pacific Coast Section.
2:30 p.m.—Entertainment for the ladies.
Bridge tea.
Seattle Yacht Club—Montlake Park.
During the afternoon the "K-B" boat will be on exhibition.

Wednesday evening—Sept. 15, 8:00 p.m.

(a) "Application of Electric Propulsion to Double-Ended Ferry Boats"—Alexander Kennedy and F. V. Smith, General Electric Company.
(b) "Lecture—"The K-B Propeller"—F. K. Kirsten, University of Washington.

Thursday morning—Sept. 17, 9:30 to 12:30.

Transmission Line Design and Operation

(a) "Stored Mechanical Energy in Transmission Systems"—J. P. Jollyman, Pacific Gas and Electric Company.
(b) "Spans Having Supports at Unequal Elevation"—G. S. Smith, University of Washington.
(c) "The Long Span Across the Narrows at Tacoma"—A. F. Darland and J. V. Gongwer, City of Tacoma.
(d) "220-kv. Transmission Transients and Flashovers"—R. J. C. Wood, Southern California Edison Company.
(e) "The Line of Maximum Economy"—E. A. Leew and F. K. Kirsten, University of Washington.
12:30 to 2:00—Luncheon. Sections and Branches Committee Meeting

Thursday afternoon—Sept. 17, 2:00 to 5:00 p.m.

1. Transmission Line Design and Operation (continued).

(f) "Fundamental Considerations Regarding Power Limits of Transmission Systems"—R. E. Doherty and H. H. Dewey, General Electric Company.
(g) "Analytical Discussion of Some Factors Entering into the Problem of Transmission Line Stability"—C. L. G. Fortescue and F. C. Hanker, Westinghouse Electric & Manufacturing Company.

2. Symposium on Distribution Practice

(a) "Distribution Line Practice of the San Joaquin Light & Power Corporation"—L. J. Moore and H. S. Minor, San Joaquin Light & Power Corporation.
(b) "Improvement in Distribution Methods"—S. B. Hood, Northern States Power Company.

Thursday afternoon—Sept. 17, 2:00 p.m.

Entertainment for the ladies.
Sightseeing trip over Seattle scenic boulevards.

Thursday evening—Sept. 17, 8:00 p.m.

Dinner dance in the Italian Room of the Olympic Hotel for Institute members and their friends.

Friday morning—Sept. 18, 9:30 to 12:30.

Symposium on Distribution Practice (continued).

(c) "The 60-Cycle Distribution System of the Commonwealth Edison Company"—W. G. Kelley, Commonwealth Edison Company.
(d) "A High-Voltage Distribution System"—Glen Smith, City of Seattle Lighting department.
(e) "A Distribution System to Adequately Supply Increasing Load Densities in Residential Areas"—M. T. Crawford, Puget Sound Power & Light Company.
(f) "Distribution Practices in Southern California"—R. E. Cunningham, Southern California Edison Company.
(g) "Power Distribution and Telephone Circuits —Inductive and Physical Relations"—D. I. Cone, The Pacific Telephone and Telegraph Company, and H. M. Trueblood, American Telephone and Telegraph Company.

Friday afternoon—Sept. 18, 2:00 to 5:00 p.m.

Symposium on Distribution Practice (concluded).

(h) "Induction from Street-Lighting Circuits—Effects on Telephone Circuits"—R. G. McCurdy, American Telephone and Telegraph Company.
(i) "The Radio Interference Problem and the Power Company"—L. J. Corbett, Pacific Gas and Electric Company.
(j) "Opportunities and Problems in the Electric Distribution System"—D. K. Blake, General Electric Company.
(k) "Engineering and Economic Features of Distribution Systems Supplying Increasing Load Densities"—L. M. Applegate, General Company, and W. Brenton, Northwestern Electric Power Company.

Friday,—Sept. 18, **Saturday**—Sept. 19.

Short trips to industrial plants, central station properties and scenic points.

COMING EVENTS

Pacific Radio Exposition—
Third Annual—San Francisco, Calif.
Aug. 22-28, 1925

National Radio Exhibition—
Third Annual—Los Angeles, Calif.
Sept. 5-12, 1925

Camp Cooperation V—
Conference of representatives of local electrical leagues—Association Island
Henderson Harbor, N. Y.
Sept. 8-12, 1925

Rocky Mountain Geographic Division, N.E.L.A.—
Annual Meeting—Glenwood Springs, Colo.
Sept. 14-17, 1925

American Institute of Electrical Engineers—
Pacific Coast Convention—Seattle, Wash.
Sept. 15-17, 1925

Executive Committee of Northwest Association Announced

With the appointment of section chairmen and the secretary-treasurer of the Northwest Electric Light and Power Association by its president, Lewis A. Lewis, to supplement the officers elected at the annual meeting of the association in Portland, June 12, 1925 (Journal of Electricity, July 1, 1925, p. 37), the personnel of the executive committee has been completed and is announced as follows:

President—Lewis A. Lewis, sales manager, The Washington Water Power Company, Spokane; vice-president for Idaho—R. B. King, general superintendent, Idaho Power Company, Boise; vice-president for Utah—D. C. Green, vice-president and general manager, Utah Power & Light Company, Salt Lake; vice-president for Oregon—George L. Myers, assistant to the president, Pacific Power & Light Company, Portland; vice-president for Washington—Norwood W. Brockett, director of public relations, Puget Sound Power & Light Company, Seattle; vice-president for Montana — A. T. Schultz, manager, Helena Light & Railway Company, Helena; member at large—A. C. McMicken, sales manager, Portland Electric Power Company, Portland; member at large, J. I. Colwell, manager, Western Electric Company, Seattle; chairman public relations section—W. H. Ude, director of public relations, The Washington Water Power Company, Spokane; chairman Commercial Section —P. M. Parry, commercial manager, Utah Power & Light Company, Salt Lake; chairman Technical Section—Z. E. Merrill, assistant general manager, Mountain States Power Company, Albany, Ore.; chairman Accounting Section—A. J. Johnstone, auditor, Portland Electric Power Company, Portland; secretary-treasurer—W. F. Miller, auditor, The Washington Water Power Company, Spokane.

Utility Man Discusses Rates at Municipal League Meeting

P. M. Parry, commercial manager of the Utah Power & Light Company, Salt Lake City, was one of the principal speakers at the annual convention of the Utah State Municipal League, held at Mount Pleasant, Utah, July 29-30. The membership of this league comprises city officials of the various cities in the state, and its object is to develop the utmost efficiency in the handling of municipal affairs.

"Rate-Making for Electric Service" was the subject of Mr. Parry's talk. He explained some of the factors that enter into the making of rates, discussing also some of the outstanding facts of interest in connection with his company's operations during the past twelve years. Mr. Parry also introduced a number of points in support of private ownership of public utilities.

Utah Engineers Hold Annual Outing. —The Utah chapter of the American Institute of Electrical Engineers held its annual outing at the Olmsted plant of the Utah Power & Light Company on the Provo River, about forty miles south of Salt Lake iCty, on July 18. The commodious and beautiful grounds surrounding this plant provided an ideal location for such an event. About one hundred members were in attendance.

Personals

L. T. Stone, for the past nineteen years in the service of the Southern California Edison Company, Los Angeles, has been made district manager for the company in Tulare. He succeeds J. R. Haskin who has been transferred to the general offices in Los Angeles. Mr. Stone started his career as office boy and messenger in the Los Angeles district and served successively as bookkeeper, statistician, chief clerk, traveling auditor and credit agent. He is well known in the San Joaquin Valley, particularly in the Porterville district, where he was chief clerk from December, 1919, to May, 1923.

L. T. STONE

H. H. Allison, formerly with the Electric Appliance Company of San Francisco, recently became affiliated with the general offices of the Great Western Power Company of California. The kitchen lighting campaign of the company, plans for which were announced recently, will be carried out under Mr. Allison's supervision.

W. D. Hamerstadt, general manager of the Rockwood Manufacturing Company of Indianapolis, was a recent visitor in San Francisco.

L. W. Clifford of the Industrial Heat Division of the Westinghouse Electric & Manufacturing Company sailed from San Francisco recently for Yangchow, Kiansing, China, where he will teach mathematics and science in the Mahan School under the auspices of the Board of Foreign Missions of the Episcopal Church.

L. F. Watson has been appointed recently by the Westinghouse Electric & Manufacturing Company as street lighting engineer for Los Angeles.

James P. Britt of the Los Angeles office of the state railroad commission has been appointed assistant secretary to the commission. This appointment is made possible by an amendment to the Public Utilities Act passed by the last legislature, and will enable the Los Angeles office to attend to all matters of process and certification which heretofore have been done under seal in the San Francisco office.

W. A. Thompson, Federal Electric Company, Chicago, was a recent visitor in San Francisco.

Frank D. Fagan, special representative of the International General Electric Company in Japan, and a former resident of San Francisco, recently passed through that city en route to New York.

W. K. Turner, J. L. Marsh and **L. B. Pierson** have been added to the staff of the Curtis Lighting, Inc., Chicago, in various capacities. Mr. Turner will be associated with **I. M. Kirlin,** resident engineer, Detroit. Mr. Marsh will be associated with **J. R. Henry,** resident engineer at the Philadelphia office and Mr. Pierson will be connected with the Rochester, N. Y., office, working with **C. B. Pate,** resident engineer.

W. L. Henderson, associated with the San Joaquin Light & Power Corporation at Selma, Calif., was a recent visitor in San Francisco.

R. H. Ballard, vice-president and general manager, Southern California Edison Company, Los Angeles, shortly returned from an extended European tour.

S. E. ("Steve") Gamble, for the past eight years connected with the industrial division of the Westinghouse Electric & Manufacturing Company, San Francisco, has resigned to become manager of the Oakland office of Latourrette-Fical Company.

F. E. Hastings of the Curtis Lighting of California, Inc., Los Angeles, recently visited Salt Lake City, Utah.

P. H. Booth, district sales manager, Edison Electric Appliance Company, Inc., Los Angeles, and **R. W. Turnbull,** district sales manager for the same company in Portland, recently spent some time in San Francisco and the Bay region.

G. H. P. Dellmann, lighting sales engineer of the San Diego Consolidated Gas & Electric Company, together with **H. W. Jorgensen,** city engineer of San Diego, made a recent visit to a number of southern California cities to observe methods of street lighting.

A. Emory Wishon, vice-president and general manager, San Joaquin Light & Power Corporation, Fresno, Calif., paid a visit to San Francisco a short while ago.

Tracy Simpson, formerly district manager, Federal Sign Company, San Francisco, and now affiliated with the Household Utilities Finance Corporation, San Francisco, recently returned to that city after an extended Eastern trip.

K. E. Van Kuran, manager of the Los Angeles division office of Westinghouse Electric & Manufacturing Company, was a recent visitor to San Diego. He brought with him as his guests to the Electric Club luncheon **F. C. Ohmstead,** chief engineer of the stoker department of the Westinghouse company, and D. E. ("Daddy") Drake, retired, Westinghouse man of much fame and experience.

H. R. Olsen, assistant treasurer of the Portland office of the Pacific States Electric Company, has been transferred to the Los Angeles office to fill the position recently vacated by **H. C. Chapman.**

W. G. ("Mac") Boyce, of the Fairbanks-Morse agency in San Diego, Calif., has been a frequent visitor recently to Nevada mining districts in the interests of mining property he owns in the region.

Z. E. Merrill, assistant general manager, Mountain States Power Company, Albany, Ore., lately visited Spokane, to attend the meeting of the newly appointed executive committee of the Northwest Light and Power Association at which Mr. Merrill was named chairman of the Technical Section for the coming year.

R. G. Chamberlain, district manager, The Hurley Machine Company, Seattle, visited Spokane recently enroute to Boise.

Millard Sebern, Washington Electric Supply Company, Spokane, Wash., spent a few days in San Francisco recently.

E. T. Milham, first executive secretary of the Rocky Mountain Electrical Cooperative League, Salt Lake City, joined the staff of the Stevens Sales Company of that city.

W. H. Lines, since 1923 construction engineer for the Portland Electric Power Company, Portland, has been appointed assistant to the president, a newly created position in that company. Mr. Lines was born in Rochester, N. Y., in 1887, and after attending public school there he entered Cornell University, Ithaca, N. Y., and graduated in 1909 with the degree of M.E. After graduation he entered the engineering department of the Rochester Railway & Light Company, Rochester, remaining until 1912, when he went to Portland to join the organization then known as the Portland Railway, Light & Power Company. Here he spent four years as industrial engineer, specializing in power sales and power promotion, and one year as secretary to the president. In 1917 he resigned to accept a position as plant superintendent of the Northwest Steel Company, Portland, which then was commencing an extensive boat-building program for the government. After this activity of the steel company was finally wound up in 1921, he started his own business of manufacturing wooden ware as the Champion Manufacturing Company, Portland. In 1923 he retired from active participation in this business to permit of its reorganization for the manufacture of walnut and mahogany furniture, and returned to the Portland Electric Power Company as construction engineer. In this capacity he has been engaged principally in a study of the needs of the entire system from the generating plants to the customers' meters, until his recent appointment.

W. H. LINES

W. A. Knost, for the past four years secretary of the Los Angeles Electric Club, has resigned that position in order to devote his entire time to his new work on the sales staff of the Illinois Electric Company. Mr. Knost is to handle appliance sales and general merchandise, exclusive of radio equipment, and will have his headquarters at 315 South San Pedro Street, Los Angeles.

Wm. F. Raber, general manager of the San Diego Consolidated Gas & Electric Company, recently returned from a trip to Chicago, coming back by way of Pueblo, Colo., where he was formerly manager of the Southern Colorado Power Company.

Lafayette Hanchett, president of the Utah Power & Light Company, Salt Lake City, left during the latter part of July, with Mrs. Hanchett, for an extended trip to Europe. The trip will cover a period of about three months.

H. D. Schute, vice-president, Westinghouse Electric & Manufacturing Company, East Pittsburgh, recently spent some time in Seattle in the inspection of the Westinghouse local plant.

V. S. Beam, representing the Westinghouse Electric & Manufacturing Company with offices in New York City, was a recent visitor in San Francisco.

W. A. Thompson, representing the Federal Electric Company of Chicago, was a recent visitor in San Francisco.

W. W. Briggs, for the past few years connected with the Federal Light & Traction Company, New York City, has been appointed vice-president and general manager of the Grays Harbor Railway & Light Company, Aberdeen, Wash., which is controlled by the Federal company. He succeeds P. A. Bertrand, who has resigned to enter the New York office of the latter. Mr. Briggs is particularly well known in San Francisco, where he was district

W. W. BRIGGS

manager for the Westinghouse Electric & Manufacturing Company for a number of years and later became general manager of the Great Western Power Company of California. In 1918 he went East to join the Westinghouse forces in New York City, and subsequently entered the Federal Light & Traction organization. In addition to his duties as manager of the Grays Harbor company, Mr. Briggs also will be the directing head of several affiliated companies.

L. B. Osborn, formerly manager of the San Francisco and Oakland Thor Shops for the Hurley Machine Company, Chicago, has been appointed manager of all the Thor Shops on the Pacific Coast, with headquarters in San Francisco.

Edward Poirier, chief clerk at Hood River, Ore., for the Pacific Power & Light Company, Portland, has resigned to become associated with a hardware store in that city. His resignation has been made the occasion for the promotion of the following clerks: **L. C. Davis,** from Sunnyside, Wash., to Hood River; **E. G. Richards,** from Goldendale, Wash., to Sunnyside; and **R. G. Dalgleish,** from the stores department at Yakima, Wash., to Goldendale.

Stephen ("Steve") Babcock, formerly with the San Francisco office of the Westinghouse Electric & Manufacturing Company, has been transferred to the company's Salt Lake City office.

W. W. Wheat, manager, North Coast Electric Company, Portland, Ore., was a Seattle visitor a short while ago.

H. C. Chapman, district treasurer, Pacific States Electric Company, Los Angeles, has resigned his position to become president of the California Wholesale Electric Company of that city.

J. T. Gleason, manager, North Coast Electric Company, Seattle, Wash., recently visited Salt Lake City, Utah.

H. E. Sandoval, president Sandoval Sales Company, San Francisco, visited Los Angeles recently.

Joseph S. Thompson, president, Pacific Electric Manufacturing Company, San Francisco, was the author of the play produced this year at the annual jinks of the Bohemian Club.

S. E. Hodge, for many years associated with the Westinghouse Electric & Manufacturing Company, has opened a new branch office of that company at Medford, Ore. Mr. Hodge has represented the Westinghouse company in Butte, Mont., Alaska, Seattle, and Johannesburg, South Africa.

D. M. Roderick, Seattle district manager of The Hoover Company, recently made a trip to the Hoover general offices and main factory at Canton, Ohio.

Warren Bruce, treasury department, Pacific States Electric Company, San Francisco, has been appointed assistant treasurer of the Portland office of that company. Mr. Bruce will fill the position vacated by **H. R. Olsen** who has been transferred to the Los Angeles office.

H. H. Courtright, manager, Valley Electrical Supply Company, was a recent visitor in San Francisco.

D. L. Scott, advertising manager, Los Angeles Gas & Electric Corporation, recently returned from Seattle, where he attended the Pacific Coast Advertising Clubs Association convention in that city.

E. J. Kingsbury and **E. E. King,** formerly with Dwight P. Robinson & Company, Inc., have opened an office in the Grant Building in Los Angeles as consulting engineers under the name of Kingsbury & King. Mr. Kingsbury is also president of The Engineering Corporation of Long Beach, Calif., and is the inventor of several patented devices which bear his name and will be manufactured by this corporation.

H. H. Daley, associated with the Magnavox Company, Oakland, returned from Los Angeles recently.

E. A. West, formerly superintendent and chief engineer of the Denver Tramway Company, Denver, has been appointed general manager of the Utah Light & Traction Company, Salt Lake City, succeeding H. F. Dicke, who has been made assistant to the president of the Lehigh Valley Transit Company, with headquarters at Allentown, Pa. Mr. West had held his position with the Denver company since 1916, with the exception of a period of a little more

E. A. WEST

than two years during the World War when he was Pacific Coast representative of the Emergency Fleet Corporation of the United States Shipping Board in charge of all matters pertaining to housing and transportation facilities for the various ports up and down the Coast. After leaving college Mr. West served in the United States Navy for several years. Prior to his association with the Denver Tramway Company he was assistant engineer of the traction system in Portland, Ore., for eight years. He began his career with the Boston elevated system in 1905, starting as a clerk.

Raymond Wilcox, formerly with Dwight P. Robinson & Company, Inc., has become treasurer and general manager of The Engineering Corporation recently incorporated to conduct a manufacturing business in Long Beach, Calif.

G. E. Honn, manager tower department, Pacific Coast Steel Company, San Francisco, recently visited Los Angeles in the interest of his firm.

Obituary

Joseph Mayo, pioneer in electrical power development in California, died suddenly in Berkeley, Calif., Aug. 4. He came to California forty years ago, settling in Healdsburg, where he operated one of the first electric plants and also did much to promote such projects in Crockett and Martinez.

Thomas Victory of the Victory Electric Company, Los Angeles, died in that city July 27.

Philip Benjamin, salesman for the Fobes Electric Supply Company in San Francisco, passed away on July 29.

TRADE NOTES

The Robbins & Myers Company, Springfield, Ohio, has issued recently bulletin No. 141, which covers its types "S," "C" and "I" direct-current motors. motors.

General Electric Company, Schenectady, N. Y., has published recently a new switchboard instruction book containing descriptions and prices of its trated with photographs, diagrams, tables and formulas. The book is designed for those engaged in the construction, installation, maintenance and operation of switchboards.

Edison Electric Appliance Company, Inc., Chicago, has issued recently a profusely illustrated dealer's catalog containing descriptions and prices of its latest Hotpoint appliances.

Altorfer Brothers Company, Peoria, Ill., has announced the development of ABC Double A electric washer, which was exhibited at the jobbers and distributors' convention held at Peoria in June.

The Louis Allis Company, Milwaukee, Wis., has issued a new bulletin describing and illustrating its Allis adjustable delivery motor drive, an alternating-current drive with an infinite number of speeds, which it is claimed is adapted particularly for use with stokers, conveyors, traveling ovens and similar equipment.

The Robbins & Myers Company, Springfield, Ohio, has issued recently bulletin No. 143 describing and illustrating its Type "L" constant speed polyphase induction motors.

Baker Electric Company, Los Angeles, has moved from 449 South Los Angeles Street to 1159 South Los Angeles Street, which gives the firm additional space to care for its increased business.

The Ward Leonard Electric Company, Mt. Vernon, N. Y., has announced the appointment of Warburton, Franki, Ltd., Sydney and Melbourne, Australia, as its selling agents in that territory.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued recently two interesting papers by Wirt S. Scott, entitled "Power Rates to Encourage Industrial Heating" and "Practical Applications of Electric Heat." Another interesting booklet has just been produced covering the "Installation of Westinghouse Electric Industrial Heating Apparatus," which contains a list of some of the more important electric industrial heating applications which the Westinghouse company has installed.

Haag Brothers Company, Peoria, Ill., claims it has produced a new model in electric washing machines called the "Haag Vortex" because of the whirlpool action of the agitator. The large increase in manufacture has necessitated the building of a new plant addition which is now in course of construction. They also have formed several large new jobber connections, among them being the Hydro Motor & Maufacturing Company at Detroit, Richter Sales Company at Seattle, and Electric Jobbers' Syndicate at Boston.

Pass & Seymour, Inc., Syracuse, N. Y., has placed on the market a new and complete line of all-porcelain receptacles, which have many new features, the procelain shade-holders and the porcelain rings being threaded to turn on the heavy metal lamp shell which extends through the porcelain cover, making a compact unit. The shade-holder feature eliminates the usual cover screws and makes the cover surface perfectly smooth. Complete selling literature is available on the new line.

K. E. Van Kuran, on Friday mornings before he dashes down to his office, where the door states that he is district manager of the Los Angeles establishment of the Westinghouse Electric & Manufacturing Company, meets the rest of the Breakfast Club and rides from 7 to 8:30. We've looked over the breakfast menu and would be willing to wager our last week's winnings in a crooked dice game that on the return to the outdoor "chow house" even Spark Plug would be bested.

Johnston-Ayres Company and **Evans Barnhill, Inc.,** San Francisco advertising agencies, recently have consolidated their business as announced by K. L. Hamman, president of the Johnston-Ayres Company. The combined business will be administered under the name of the Johnston-Ayres Company with offices in the First National Bank Building, San Francisco. The Johnston-Ayres Company was established in 1904 and is affiliated with the L. S. Gillham Company of Los Angeles and Salt Lake City and the K. L. Hamman-Advertising in Oakland.

Perkins Corporation, South Bend, Ind., has issued a pamphlet descriptive of its new Perkins Aerolectric, which it claims has many advantages for the farmer, bringing a windmill-driven electric plant to his door with an inexhaustible supply of electricity. It is simple in construction, having only four moving parts all running in oil. The mechanism of the machine is described fully in the pamphlet.

Curtis Lighting of California, Inc., Los Angeles, recently has developed two new X-ray silvered mirrored glass reflectors known as Jove No. 600 and Jupiter No. 610. It also has produced two new holders, Nos. 10,600 and 10,700. The former is made to fit X-ray receptacle and box cover combination, while the 10,700 holder will fit any standard brass shell, porcelain, condulet or weatherproof socket.

New England Electric Company, 1951 Lawrence Street, Denver, has designed recently an externally operated flush type distribution cabinet with enclosed main line switch. **The Commercial Manufacturing & Supply Company,** also of Denver, has perfected a similar device.

Jackson-Brannan Telephone Service Company recently has been organized by R. E. Jackson and H. M. Brannan, both of whom formerly were associated with the Los Angeles Telephone & Signal Company. They are located at 1118 West 8th Street, Los Angeles.

The Balboa Electric Company has moved recently into its new quarters at 2946 Adams Avenue, San Diego. The concern formerly was located at 438 University Avenue.

The Pelton Water Wheel Company, San Francisco, has issued bulletins 21 and 22, which are fully descriptive of its new Type FD and Type T pumps.

The California Electric Works, Inc., now is occupying its new quarters at 420 Eighth Street, San Diego. The firm recently has taken over the Westinghouse motors.

Ernest Ingold, Inc., wholesale radio, opened on July 24 and 25 its new 3-story, steel and concrete building at 930 Van Ness Avenue, San Francisco, which it is announced will be "devoted exclusively to the finer things of radio and dedicated to the service and profit of the dealers of northern California."

Laundryette Manufacturing Company, Cleveland, Ohio, has opened recently a Pacific Coast district office at 115 Townsend Street, San Francisco. E. B. Anderson has been placed in charge of this territory, while H. D. Mills has been appointed Western sales manager covering Denver, Salt Lake City, Vancouver, B. C., Seattle, Portland, San Francisco and Los Angeles.

The Electro-Kold Corporation, Spokane, makers of the Electro-Kold home refrigerator, has established two new agencies recently for the distribution of its product. These include the **Mountain States Power Company,** Albany, Ore., for the territory served by this company in and around Albany, and **R. W. Wilson,** 137 East White Oak Street, Monrovia, Calif.

The Pacific Electric Manufacturing Company, San Francisco, recently has opened a district office in Los Angeles at 804 I. W. Hellman Building for the purpose of giving better service to its customers in the Southwest territory. L. C. Williams, formerly of the Los Angeles Bureau of Power and Light, has been made manager.